

August 27 2010

VIA FEDERAL EXPRESS

Kenneth S. Komoroski
D 412.355.6556
F 412.355.6501
kenneth.komoroski@klgates.com

Ms. Karen Melvin
Associate Division Director, Office of Enforcement
Hazardous Site Cleanup Division
U.S. Environmental Protection Agency, Region III
Oil and Prevention Branch (3HS61)
1060 Chapline Street
Wheeling, WV 26003

RECEIVED

AUG 30 2010

**Removal Enf. & Oil Section
USEPA, Wheeling Office**

**Re: Range Resources Appalachia, LLC's Response to June 11, 2010
Request for Information**

Dear Ms. Melvin:

Enclosed please find the response ("Response") of Range Resources – Appalachia, LLC ("Range Resources") to the information request dated June 11, 2010 (the "Request") of the U.S. Environmental Protection Agency ("EPA"), which was received by Range Resources on June 14, 2010. Per my discussions with James Van Orden, the EPA granted Range Resources until August 27, 2010, to submit this Response. We truly appreciate EPA's understanding and allowance of additional time to respond.

Respectfully, Range Resources wishes to make clear that it is providing this information in order to assist in EPA's information gathering efforts. The information request states that EPA "received notification that Range discharged oil and/or hazardous substances in quantities that may be harmful in violation of Section 311(b)(3) of the Federal Water Pollution Control Act, 33 U.S.C. § 1321(b)(3) (the "Act")." It is not clear or known to Range who provided EPA with such a notification. Range Resources did not make any such notification because it believed then and still believes that the discharge that occurred did not involve a discharge of oil or hazardous substances in quantities that may be harmful in violation of the Act. Thus, there was no duty to report this incident to the EPA.

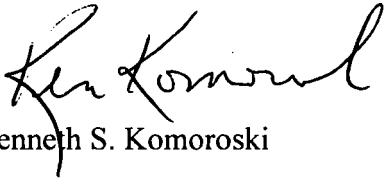
Without waiving these concerns, Range Resources is willing to provide this assistance to the EPA and encloses its Response to that end. As I discussed with James Van Orden, in this initial response, Range Resources' Response is limited to the pipeline discharge incident. We appreciate that, as part of its investigation efforts, EPA has requested information that is more broadly applicable to operations that are unrelated to the incident. Please be assured that Range Resources will be willing to supplement this Response, as appropriate, if it is necessary to provide additional information. We respect the fact that EPA is not familiar with Range Resources' operations and the circumstances surrounding the

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incident and thus the Request was made broadly. After EPA reviews this Response, we suggest a conference call or meeting to ensure an adequate understanding has been achieved and to determine if additional information is necessary. Range Resources will continue to cooperate to fulfill any such necessary information requests.

We hope that the enclosed information is of assistance to you. Please do not hesitate to contact me with any questions or concerns you may have.

Sincerely,

A handwritten signature in black ink, appearing to read "Ken Komoroski", written over the printed name.

Kenneth S. Komoroski

KSK:

cc: Carla Suszkowski, P.E.
James Van Orden, Esquire

**Range Resources-Appalachia, LLC's Responses to the United States Environmental
Protection Agency's June 11, 2010 Request for Information**

The request for information (the "Request") of the U.S. Environmental Protection Agency (the "EPA") dated June 11, 2010 seeks to obtain information regarding a discharge of water which occurred on October 6, 2009 in conjunction the operations of Range Resources-Appalachia, LLC ("Range Resources") near and/or at Kearns Unit Well Nos. 1H, 2H, 3H, 4H, 5H, and 6H in Hopewell Township, Washington Co., Pennsylvania (the "Pipeline Discharge"). The Request was issued under the auspices of obtaining information regarding a violation of Section 311(b)(3) of the Federal Water Pollution Control Act, 33 U.S.C. § 1321(b)(3). Section 311(b)(3) prohibits discharges of hazardous substances in excess of quantities as provided by 40 C.F.R. § 117.3. Nothing identified as a "hazardous substance" was released in prohibited amounts as a result of the Pipeline Discharge. Consequently, no reportable release occurred and the EPA's Request is without legal basis under the identified statutory or regulatory authority.

Subject to and without waiving its objections to the Request, Range Resources voluntarily provides the following responses ("Responses"), which are limited to the Pipeline Discharge. To the extent the Request seeks information not pertaining to the Pipeline Discharge, such information requests are both beyond the EPA's investigatory authority as provided by 33 U.S.C. § 1321(b)(3) and 40 C.F.R. § 117.3 and is unreasonable under the given circumstances.

The Request seeks information pertaining to a "Facility", a term defined in the EPA's Enclosure 1. Range Resources notes that the definition of "Facility" pertains to structures, equipment or pipelines used solely in conjunction with oil. As Range Resource's operations are in the nature of natural gas development and production, Range Resources regards the use of the term "Facility" as defined in the Request as ambiguous. Consequently, Range Resources has voluntarily deemed the information requests using the term "Facility" as seeking information related to structure, equipment and pipeline used in connection with Range Resource's natural gas operations and has responded appropriately thereto, subject to the above-noted limitations, even though Range Resources did not transport or release any oil from the Pipeline.

1. Identify all substances released from the Facility in connection with the above referenced incident. Specifically, identify:
 - a. The name and Chemical Abstract Services ("CAS") Number for each substance discharged;
 - b. For oils, identify the type and grade;
 - c. Provide the quantity, concentration of each substance discharged and the method by which the concentration was measured or estimated. For mixtures, provide the name, quantity, and concentration of each constituent of that mixture
 - d. Provide the solubility and specific gravity of each substance discharged.

Response: The material that was discharged was a mixture of flowback water and freshwater (“diluted flowback water”). Range Resources is currently achieving its goal of recycling and reusing all flowback waters. Flowback water results after hydraulic fracturing well stimulation. The produced flowback water does contain small amounts of sand and small concentrations of additives that are introduced into a well for the purposes of hydraulic fracturing. This water also contains small concentrations of salts and minerals that are dissolved from the shale formation. Range Resources is unable to specifically identify the sources, the precise contents, or the concentrations of materials that were released. Flowback water from several wells was transported to an impoundment where freshwater was added for recycling and reuse. This combination of flowback water and freshwater was being pumped to another location to be used for future hydraulic fracturing operations when the discharge occurred due to a manufacturing defect in a pipefitting. Although the precise sources of the material actually released is not precisely known, a sample of diluted flowback water was taken from the piping involved and sent for characterization with the following results:

- pH = 7.7
- Chloride = 11,000 mg/L
- Specific Gravity = 1.015
- Hardness = 37.4 mg/L
- Calcium = 1503 mg/L
- Iron = 3 mg/L
- Bicarbonate = 146 mg/L

Frac water typically utilized by Range Resources consists of approximately 99.86 percent water (94.62 percent) and sand (5.24 percent). Frac water additives other than water and sand are typically used as follows:

<u>Additive Type</u>	<u>Compounds</u>	<u>Approximate Concentration</u>
Scale inhibitor	Ethylene glycol, alcohol, and sodium hydroxide	.01 percent
Antimicrobial agent	Glutaraldehyde, ethanol, and methanol	.06 percent
Friction reducer	Polyacrylamide	.05 percent
Diluted Acid	Hydrochloric acid	.03 percent

Based upon the chlorides concentration, it is estimated that the flowback water was diluted approximately 4:1, freshwater:flowback water. Based upon DEP Form 26R information, no reportable quantity release occurred. This is based upon a calculation that hazardous substances with a reportable quantity of one pound would have to be present at a concentration above 50 ppm; hazardous substances with a reportable quantity of ten pounds would have to be present at a concentration above 500 ppm; and etc. Based upon these calculations, no hazardous substances were discharged above reportable quantities. Further, there was no oil present or released.

2. Describe the physical source (including, but not limited to vehicle, outfall, tank, container, pipe, ditch, conduit, or equipment) at the Facility from which the oil and/or hazardous substance or substances (the term "substance" as used here includes both oils and hazardous substances) initially was discharged on or around October 6, 2009. If the substance was discharged from more than one source, please identify each specific source.

Response: The material discharged did not contain any oil or any hazardous substances in reportable quantities. Diluted flowback water was released at the point of the failure of a 90 degree elbow coupling (the “Elbow”) in an 8-inch diameter PVC pipeline (“Pipeline”) used to transport diluted flowback water collected at the Bednarski Impoundment over a distance of approximately six miles to the Kearns Impoundment for use/re-use in hydraulic fracturing operations at the Kearns Unit. The Pipeline was laid through a culvert under Cherry Road using PVC pipe and the Elbow. The Elbow, located at N40 12’ 39.6” and W80 23’ 51.2”, failed and ruptured. The manufacturer inspected the Elbow and identified it as being defective from manufacture.

3. Provide the total quantity of undiluted substance(s) released from the Facility in gallons for oils and in pounds for hazardous substances.

Response: Range Resources estimated that approximately 250 barrels (10,000 gallons) of diluted flowback water was released. Of that amount, approximately 500 gallons were removed via vacuum truck. There was no oil released and no measureable amounts in pounds of any hazardous substances.

4. List the location of the discharge, including the closest street address, the city, county, state, zip code, and provide the Global Positioning System (“GPS”) coordinates

Response: The discharge occurred at a location in Hopewell Township, Pennsylvania with no nearby street address, at or about N40 12’ 39.6” and W80 23’ 51.2”.

5. List the starting time, date, and duration of the discharge and the time and date when the discharge entered a waterway.

Response: On October 6, 2009 at approximately 7:00 p.m., Red Oak Water Transfer (“Red Oak”), the contractor engaged in the transfer of the diluted flowback water

between the Bednarski Impoundment and the Kearns Impoundment, noted the loss of pressure at a pump on the Pipeline, signifying a potential leak. Red Oak personnel immediately turned off the pump, cutting the flow of water in the Pipeline, and followed the Pipeline to discover the ruptured Elbow. The released diluted flowback water entered an unnamed tributary of Brush Run.

6. List the time and date of the discovery of the discharge and the person(s) who made the discovery.

Response: On October 6, 2009 at approximately 7:00 p.m., Red Oak, the contractor engaged in the transfer of the diluted flowback water between the Bednarski Impoundment and the Kearns Impoundment, noted the loss of pressure at a pump on the Pipeline, signifying a potential leak. Red Oak personnel immediately turned off the pump, cutting the flow of water in the Pipeline, and followed the Pipeline to discover the ruptured Elbow.

7. List the federal and state agencies, if any, to which the owner and/or operator reported the discharge(s), the dates and times on which the reports were made, and the name(s) and title(s) of the person(s) who made the reports.

Response: Upon the discovery of the discharge, Environmental & Safety Technician, Jeremy Matinko of Range Resources, reported the spill to Inspector Supervisor Richard Freese of the Pennsylvania Department of Environmental Protection ("DEP") at 7:40 p.m. Additionally, Carla Suszkowski, Range Resource's Director, Environmental and Regulatory, contacted DEP Inspector Supervisor Mike Arch.

8. Identify the first body of water that the substance reached. Identify the actual or estimated quantity of the substance(s) that entered that water body. Describe the location of any other water bodies that the substance(s) subsequently entered, including the actual

or approximate distance from the Facility. In addition, state the actual or estimated quantity of the substance(s) that entered those additional water bodies.

Response: The diluted flowback water reached a very small unnamed tributary of Brush Run. Range Resources is unable to provide an estimate of the quantity of the diluted flowback water which reached the unnamed tributary except that, as discussed above, approximately 10,000 gallons were discharged from the Pipeline.

9. Identify any storm drains or sewers through which the substances flowed, and identify the waters to which those storm drains or sewers subsequently drain. State the actual or estimated quantity of the substance(s) that entered the storm drain or sewer.

Response: There were no storm drains or sewers through which the water flowed.

10. Identify whether each water identified in response to Questions 8 and 9 was, at the time of the spill, a "navigable water" as defined in Enclosure 1, a tributary of a navigable water; and/or physically connected to a navigable water. Identify all such navigable waters by name and identify the type of body of water (e.g. river, stream, lake, creek, or other type of body of water).

Response: The diluted flowback water reached a small, unnamed tributary of Brush Run that is not navigable water. Brush Run is a "blue line" stream on USGS topographic maps.

11. If no navigable waters are identified in response to Questions 10, identify whether the water system at any time connects with or flows into any hydrological system (such as a creek system). If so, identify the flow, extent, and duration of the connection to that system.

Response: The diluted flowback water reached a small, unnamed tributary of Brush Run that is not navigable water. Brush Run is a "blue line" stream on USGS topographic maps. Range Resources does not know the flow, extent and duration of the connection with Brush Run or the creek system.

12. State the flow in cubic feet per second of each water body described in response to Questions 8 and 9. If there is no gauge station in the vicinity, please estimate the flow and provide the basis for that estimate.

Response: There is no gauge station located on the small, unnamed tributary of Brush Run and Range Resources is unable to provide a meaningful estimate of the flow of the tributary at the time of the Pipeline Discharge.

13. Provide a description and the location of any adjoining shoreline upon which that substance may have reached. In addition, state the quantity of the substance that reached the adjoining shoreline.

Response: The material discharged was water and did not appear to, nor would it be expected to, contact any adjoining shoreline.

14. For all discharges of oil to navigable waters, adjoining shorelines to navigable waters, or to any other water/shoreline, please indicate the following:

- a. Did you observe from the oil a film, sheen, discoloration or iridescent appearance on the surface or shoreline of any water? If yes, please describe your observations;

Response: There was no oil released.

- b. Did, to your knowledge, any other person observe from the oil a film, sheen, discoloration or iridescent appearance on the surface or shoreline of any water? If yes, please identify all such persons and describe those observations;

Response: There was no oil released and no sheen of any kind observed.

- c. Did you observe any oil sludge or oil emulsion beneath the surface or on the adjoining shorelines of any water? If yes, please describe your observations;

Response: There was no oil released and no oil sludge or oil emulsion could have been formed or occurred.

- d. Did, to your knowledge, any other person observe any oil sludge or oil emulsion to be deposited beneath the surface or on the adjoining shorelines of any water? If yes, please identify all such persons and describe those observations.

Response: There was no oil released and no oil sludge or oil emulsion was observed.

15. Describe any damage to animal life or vegetation that you observed or otherwise have knowledge of.

Response: The DEP conducted an inspection in connection with the Pipeline Discharge on October 7, 2009 and identified a loss of approximately 200 to 300 minnows collectively weighing approximately 1 pound. At the time of inspection, the DEP also observed what appeared to be a sewage discharge upstream (unrelated to Range Resources' operations) from the point of the Pipeline Discharge into the unnamed tributary.

16. List the name, address, telephone number, and affiliation of any and all persons who made any observations in response to Questions 14 and 15.

Response: Range Resources is aware of the following people and/or contractors which were involved in the response to the Pipeline Discharge:

- Tony Gaudlip (Range Resources)
- Ralph Tijerina (Range Resources)
- Sean Hoghes (Range Resources)
- Jeremy Matinko (Range Resources)
- Matt Werner (Range Resources)
- Red Oak personnel, the names of whom are not available readily to Range
- Bryon Miller (DEP)
- Vince Yantko (DEP); and
- Brian Dillemoth (DEP).

17. Identify the effect of the spill(s) on any water supply and give details if available (e.g., shutdown of public or private water supply). Provide the names and addresses of all persons that have been provided with an alternative water supply (e.g., bottled water) due to the spill or because of the threatened migration of contamination.

Response: There were no effects of any kind on any water supply.

18. Does the facility have a National Pollutant Discharge Elimination System (NPDES) Permit or permit application? If yes, provide the permit number or, if no permit number has been issued at the time, the date upon which the application was filed.

Response: The Pipeline did not have an NPDES permit and none was required.

19. If the substance(s) was discharged from an outfall, state whether the outfall was covered by an NPDES permit issued pursuant to Section 402 of the Act.

Response: There was no discharge of any substance from any outfall.

20. Identify all NPDES or state wastewater discharge permit conditions and/or water quality standards that may have been violated by the spill.

Response: There were no NPDES or state wastewater discharge permit conditions or water quality standards violated.

21. Provide a complete description of the cause or causes of the discharge (e.g., pump failure, by-pass of treatment system), as well as any other relevant circumstances. If the discharge was caused by the actions of a third party (for instance, as the result of an accident or vandalism), describe in detail the measures that were in place to prevent such actions. For vandalism, identify any enforcement agencies to which the owner or operator reported the vandalism.

Response: As described in Responses to Request Nos. 1, 2 and 5 above, the 90 degree Elbow in the Pipeline, which was located on an uphill end of a culvert, ruptured, due to a manufacturing defect, allowing the release of diluted flowback water. The Pipeline was later inspected by its manufacturer, which identified the Elbow as defective. The

Pipeline had been pressure tested with freshwater prior to its use for diluted flowback water.

22. Describe all steps taken to contain and cleanup the spill(s) and to mitigate any environmental damage and/or threat to human health.

Response: Upon discovering the Pipeline Discharge, Range Resources and Red Oak undertook to contain the release. Red Oak immediately stopped the related pump and the flow through the Pipeline was stopped. A vacuum truck was brought to the site, where it removed approximately 500 gallons of the released diluted flowback water. Absorbent material was used in the immediate area to soak up residual water. Additionally, the area was flushed with approximately 1,200 gallons of fresh water.

23. Describe any actions taken or planned to prevent the recurrence of incidents such as the release(s) identified above.

Response: Although this spill was not preventable since it resulted from a latent manufacturing defect in the Elbow that was not revealed during pressure testing, the defective Elbow was replaced with a longer curved elbow coupling to reduce the possibility of pressure surge effects. Additionally, Range Resources updated its Preparedness, Prevention, and Contingency Plan ("PPC") to include an Appendix for water transfer operating standards.

24. List the names, addresses, telephone numbers, and affiliations (e.g., name of governmental agency, contractor, or other entity) of all persons who were on the scene during the incident and/or during cleanup operations, as well as any other persons not present but otherwise believed to have knowledge of the facts surrounding the incident or incidents. For each person identified in response to this question, provide the time period during which they were present at the facility. In responding to this question, for each complaint by an individual you have received related to your operations at the Facility, provide the person's name and phone number, as well as any written record of that

complaint or a written narrative describing any oral complaint; Provide any subsequent communications with the party(ies) that filed the complaint.

Response: Range Resources is aware of the following people and/or contractors which were involved in the response to the Pipeline Discharge:

- Tony Gaudlip (Range Resources)
- Ralph Tijerina (Range Resources)
- Sean Hoghes (Range Resources)
- Jeremy Matinko (Range Resources)
- Matt Werner (Range Resources)
- Red Oak personnel, the names of whom are not available readily to Range
- Bryon Miller (DEP)
- Vince Yantko (DEP); and
- Brian Dillemoth (DEP).

25. Provide the date on which operations began at the Facility. Identify all Natural Gas Production Facilities (NGPFs) (as further defined in Enclosure 1) owned and/or operated by you connected to or otherwise associated with the Facility at any time. Identify all components of each NGPF, including but not limited to wells, piping, tanks, other equipment, and surface impoundments.

Response: See Responses to Request Nos. 1, 2, 5 and 21. By way of further response, Range's Bednarski Impoundment is subject to ESCGP-1 Permit No. 0063-08-8-005 and Dam Permit No. DOG6309-0002. The Bednarski Impoundment has a capacity of 260,000 barrels. Additional information regarding the Bednarski Impoundment may be located in the Erosion and Sedimentation Control/Stormwater Management Plan for the Bednarski Fresh Water Impoundment, a copy of which is attached hereto at Tab 1. Range's Kearns Impoundment is subject to ESCGP-1 Permit No. 0063-08-8-002. The Kearns Impoundment has a capacity of 190,000 barrels. Additional information regarding

the Kearns Impoundment may be found in the Erosion and Sedimentation Control Plan Narrative, a copy of which is attached hereto at Tab 2.

26. Provide the name(s) and address(es) of the owner(s) of the Facility described above in Question 25. In doing so, for all production facilities identified in response to Question 25, state the date that the owner obtained ownership and/or control over the production facilities and provide all documents evidencing or relating to such ownership, operation or lease, including but not limited to purchase and sale agreements, deeds, and leases.

Response: Range Resources is the operator and maintains control over the equipment and facilities.

27. Identify all drill pads and/or drill rigs owned and/or operated by you at or within 10 miles of the Facility at any time. For each drill pad and/or drill rig, identify the year on which that drill pad and/or rig was installed at its present location and any past location.

Response: Such operations information is not in any way relevant to or within the scope of the EPA inquiry. That notwithstanding, Range Resources operates multiple wells within 10 miles of the Discharge location. All of these wells are being drilled or have been drilled into the Marcellus Shale and information about such operations is available through the public records of the DEP.

28. Provide the name and address of the operator(s) of the Facility described above in Question 25 and describe the relationship between the owner(s) and operator(s) (i.e., employee, subcontractor, lessee, etc.). Identify any persons who concurrently with you exercised actual control or who held significant authority to control activities at the Facility at any time. In answering this question, include:

- a. Partners and/or joint ventures;
- b. Every contractor, subcontractor, or licensor with any presence or activity at the Facility (e.g., service contractors, remediation contractors, management and operator contractors, licensor providing technical support for licensed activities);
- c. All persons who exercised actual control over any activities or operations at the Facility;

- d. All persons who held significant authority to control any activities or operations at the Facility;
- e. All persons who had a significant presence or who conducted significant activities at the Site;
- f. All government entities that had proprietary (as opposed to regulatory) interest or involvement with regard to the activity at the Facility.

Response: Range Resources is the operator and maintains control over the equipment and facilities. Red Oak is a contractor engaged in the transfer of the diluted flowback water between the Bednarski Impoundment and the Kearns Impoundment.

29. Identify all prior owners and operators of the production facilities identified in response to Question 25 and the drill pads identified in response to Question 27. For each prior owner/operator, identify:

- a. The dates of installation, ownership, and/or operation;
- b. All evidence of the activities that were conducted at the production facilities and drill pads at that time, including but not limited to any information about wells installed, operated, and/or decommissioned during any period of prior ownership/operation;
- c. All integrity test results, materials inventories, and/or notifications and reports made to and received from local, state, and federal authorities; and
- d. Any information you have access to regarding the substances used in connection with the production facilities during any period of prior ownership/operation.

Response: Range Resources owns and operates the natural gas wells identified in Question 27. There are no prior owners/operators of these wells.

30. Describe the nature of the work conducted by you at each NGPF identified in response to Question 25. For each NGPF owned or operated by you, provide information on the installation, operation, and maintenance of those production facilities. Your response should include, but not be limited to the following for each well:

- a. The name or identifier of each well;
- b. Well construction information (including specifications on casing depths, cement tops/bottoms, and perforated zones);

- c. Well maintenance information (including logs and inspection records);
- d. Well incident information (including fluid loss during drilling or storage, cement loss, problems during hydraulic fracturing or other operations). Provide any root cause analysis conducted and corrective actions taken in response;
- e. Well lithologic logs (also known as “mud logs”); and
- f. The constituents contained in as well as the quantities of those constituents in any produced water, brine and/or, any other fluids associated with those wells.

Response: The requested information is not in any way relevant to or within the appropriate scope of the EPA request. That notwithstanding, Range Resources operates multiple wells within 10 miles of the Discharge location. All of these wells are being drilled or have been drilled into the Marcellus Shale and information about such operations is readily available through the public records of the DEP.

31. Identify any contractors used by you that conducted any activities related to the wells identified in response to Question 30. For each contractor, identify:
- a. The dates that they conducted work;
 - b. The nature of the work they conducted.

Response: The requested information is not in any way relevant to or within the appropriate scope of the EPA request. Range Resources operates multiple wells and uses several contractors in support of well activities.

32. Identify any other leaks, spills, or releases of oil and/or hazardous substances into the environment that have occurred from the Facility. For each such release, provide the following:
- a. date;
 - b. duration of the release;
 - c. substance(s) released;
 - d. the approximate quantity of the substance(s) released;

- e. the origin of the release;
- f. the cause of the release;
- g. the location of the release;
- h. any and all activities undertaken in response to each such release or threatened release, including the notification of any agencies or governmental units about the release;
- i. The result of any and all investigations of the circumstances, nature, extent or location of the release or threatened release, including the results of any soil and water (ground and surface) testing undertaken;
- j. Whether any persons were provided with an alternative water supply; and
- k. All persons with information related to these releases.

Response: There have been no such releases from the Facility.

33. Provide any other reports, information or data related to activities conducted at or near the wells by you, your predecessors, contractors, and/or any other entity.

Response: The requested information is not in any way relevant to or within the appropriate scope of the EPA request.

34. Provide a complete inventory of any compounds used at all NGPFs identified in response to Question 25. Include the chemical composition, characteristics, physical state of each compound, along with the MSDSs, CAS Numbers, and product names.

Response: The material that was discharged was diluted flowback water. Range Resources is currently achieving its goal of recycling and reusing all flowback waters. Flowback water results after hydraulic fracturing well stimulation. The produced flowback water does contain small amounts of sand and small concentrations of additives that are introduced into a well for the purposes of hydraulic fracturing. This water also contains small concentrations of salts and minerals that are dissolved from the shale formation. Range Resources is unable to specifically identify the sources, the precise

contents, or the concentrations of materials that were released. Flowback water from several wells was transported to an impoundment where freshwater was added for recycling and reuse. This combination of flowback water and freshwater was being pumped to another location to be used for future hydraulic fracturing operations when the discharge occurred due to a manufacturing defect in a pipefitting. Although the precise sources of the material actually released is not precisely known, a sample of diluted flowback water was taken from the piping involved and sent for characterization with the following results:

- pH = 7.7
- Chloride = 11,000 mg/L
- Specific Gravity = 1.015
- Hardness = 37.4 mg/L
- Calcium = 1503 mg/L
- Iron = 3 mg/L
- Bicarbonate = 146 mg/L

Frac water typically utilized by Range Resources consists of approximately 99.86 percent water (94.62 percent) and sand (5.24 percent). Frac water additives other than water and sand are typically used as follows:

<u>Additive Type</u>	<u>Compounds</u>	<u>Approximate Concentration</u>
Scale inhibitor	Ethylene glycol, alcohol, and sodium hydroxide	.01 percent
Antimicrobial agent	Glutaraldehyde, ethanol, and methanol	.06 percent
Friction reducer	Polyacrylamide	.05 percent

Diluted Acid	Hydrochloric acid	.03 percent
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Based upon the chlorides concentration, it is estimated that the flowback water was diluted approximately 4:1, freshwater:flowback water. Based upon DEP Form 26R information, no reportable quantity release occurred. This is based upon a calculation that hazardous substances with a reportable quantity of one pound would have to be present at a concentration above 50 ppm; hazardous substances with a reportable quantity of ten pounds would have to be present at a concentration above 500 ppm; and etc. Based upon these calculations, no hazardous substances were discharged above reportable quantities. Further, there was no oil present or released.

35. Provide all documents, reports, information, or data collected related to the substances placed into and taken from the wells possessed by you or any party related to you by contract or otherwise. Your response should include, but not be limited to:
- a. Analysis of production water constituents;
 - b. Analysis of condensate constituents;
 - c. Drilling fluid components (Material Safety Data Sheets (MSDSs), Chemical Abstract Systems (CAS) Numbers, product names;
 - d. Water/geochemistry analysis from discrete production zones.
 - e. Provide the following information (including any reports that include such information) related to the injection of substances into the wells by you or any other person, including but not limited to:
 - f. Hydraulic fracturing fluid components (including MSDS, CAS Number, product names);
 - g. Workover fluids (including all underlying components of workover fluids) (including MSDS, CAS Number, product names);
 - h. Formation fracturing records for wells (including the depths and dates).

Response: The material that was discharged was diluted flowback water. Range Resources is currently achieving its goal of recycling and reusing all flowback waters. Flowback water results after hydraulic fracturing well stimulation. The produced flowback water does contain small amounts of sand and small concentrations of additives that are introduced into a well for the purposes of hydraulic fracturing. This water also contains small concentrations of salts and minerals that are dissolved from the shale formation. Range Resources is unable to specifically identify the sources, the precise contents, or the concentrations of materials that were released. Flowback water from several wells was transported to an impoundment where freshwater was added for recycling and reuse. This combination of flowback water and freshwater was being pumped to another location to be used for future hydraulic fracturing operations when the discharge occurred due to a manufacturing defect in a pipefitting. Although the precise sources of the material actually released is not precisely known, a sample of diluted flowback water was taken from the piping involved and sent for characterization with the following results:

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Frac water typically utilized by Range Resources consists of approximately 99.86 percent water (94.62 percent) and sand (5.24 percent). Frac water additives other than water and sand are typically used as follows:

<u>Additive Type</u>	<u>Compounds</u>	<u>Approximate Concentration</u>
Scale inhibitor	Ethylene glycol, alcohol, and sodium hydroxide	.01 percent
Antimicrobial agent	Glutaraldehyde, ethanol, and methanol	.06 percent
Friction reducer	Polyacrylamide	.05 percent
Diluted Acid	Hydrochloric acid	.03 percent

Based upon the chlorides concentration, it is estimated that the flowback water was diluted approximately 4:1, freshwater:flowback water. Based upon DEP Form 26R information, no reportable quantity release occurred. This is based upon a calculation that hazardous substances with a reportable quantity of one pound would have to be present at a concentration above 50 ppm; hazardous substances with a reportable quantity of ten pounds would have to be present at a concentration above 500 ppm; and etc. Based upon these calculations, no hazardous substances were discharged above reportable quantities. Further, there was no oil present or released

36. Provide all reports, data or other information related to soil, water (ground and surface) and geology/hydrogeology at and around the Site. Provide copies of all documents containing such data or information, including past and present aerial photographs as well as documents containing the basis for and/or analysis or interpretation of that data or other information.

Response: Range Resources is not aware of any responsive information other than that which is included with the incident report enclosed herewith.

37. Describe the storage units at the facility (e.g., above ground tanks or underground tanks) and provide the types of substance(s) stored and the total storage capacity of each storage unit by name and CAS number. In answering this question, include substances and capacities of “oil-filled equipment” and “mobile refuelers” that are defined in Enclosure 1. Identify the storage units and provide the storage capacity of each unit identified with each NGPF and identify the types of substance(s) stored and the total storage capacity of each storage unit by name and CAS number for those units. In responding to this question, indicate whether each substance is an oil and/or a hazardous substance.

Response: The Discharge involved pipeline transport of diluted frac water from and to impoundments. No aboveground or underground tanks were involved.

38. Has any contaminated soil ever been excavated or removed from areas around or near the wells?” If so, provide the following:
- Amount of soil excavated;
 - The substances contained in the excavated soil;
 - Location of excavation;
 - Distance from a navigable water of the United States or an adjoining shoreline;
 - Description of the pathway from the excavated soil area to a navigable water of the US or an adjoining shoreline, including topography and an analysis of whether the materials could reach a navigable water or adjoining shoreline;
 - Any information, including data, maps, and reports, related to any plume of substances associated with any soil excavation.

Response: The Discharge involved pipeline transport of diluted frac water from and to impoundments. There are no contaminated soil excavations associated with this activity. The Discharge occurred a considerable distance from any and all well activities.

39. If the Owner or Operator has in place a Spill Prevention, Control and Countermeasures (“SPCC”) Plan pursuant to 40 C.F.R. Part 112, a Facility Response

Plan ("FRP") prepared pursuant to 40 C.F.R. § 112.20, a state oil spill prevention plan, and/or some other spill prevention plan, provide EPA with a copy of all such plans. Please indicate whether a professional engineer prepared and/or certified any plan in place at the Facility. In the event the plan is undated, provide the date(s) on which the plan was prepared and implemented.

Response: As of the date of the Pipeline Discharge, a PPC Plan existed. As described in the Response to Request No. 23, the PPC Plan has since been updated. A copy of the original PPC Plan is attached at Tab 3 and the updated PPC Plan at Tab 4.

40. Provide a description of all procedures used to prevent and/or contain spills of substances from the Facility. This description should indicate the tanks, tank cars, tank trucks, or other equipment that are protected by dikes, the amount of material that can be contained by each dike, and the number of tanks, tank cars, tank trucks, and other equipment protected by each dike.

Response: A copy of the PPC Plan is attached at Tab 4.

41. Indicate the material used to construct each dike and the condition of each dike listed in Question 40.

Response: No dikes were constructed.

42. In the event that the Owner or Operator does not have in place a SPCC Plan, FRP or state oil prevention plan, describe any actions taken or proposed to prevent the recurrence of any spill identified in response to Question 1.

Response: As of the date of the Pipeline Discharge, a PPC Plan existed. As described in the Response to Request No. 23, the PPC Plan has since been updated. A copy of the original PPC Plan is attached at Tab 3 and the updated PPC Plan at Tab 4. Although this spill was not preventable since it resulted from a latent manufacturing defect in the Elbow that was not revealed during pressure testing, the defective Elbow was replaced with a longer curved elbow coupling to reduce the possibility of pressure surge

effects. Additionally, Range Resources updated its PPC Plan to include an Appendix for water transfer operating standards.

43. List any other information you wish to bring to the attention of the federal government at this time related to this matter.

Response: None at this time.

Certify the information provided in response to the above questions in the following manner:

I hereby certify the above to be true and accurate to the best of my knowledge.

Signature: Carla Suszkowski

Name (Please print or type): Carla Suszkowski, P.E.

Title: Director, Regulatory and Environmental

Telephone Number: 724-873-3226

**EROSION AND SEDIMENTATION CONTROL/STORMWATER
MANAGEMENT PLAN**

RANGE RESOURCES – APPALACHIA, LLC

**BEDNARSKI FRESH WATER IMPOUNDMENT
HOPEWELL TOWNSHIP
WASHINGTON COUNTY, PENNSYLVANIA**

Prepared by:

**RANGE RESOURCES – APPALACHIA, LLC
380 SOUTHEPOINTE BLVD., SUITE 300
CANONSBURG, PA 15317**

September 2008

**RECEIVING STREAM: BRUSH RUN (WWF) IN THE
BUFFALO CREEK WATERSHED (HQ WATERSHED)**

**DISTANCE TO NEAREST STREAM: APPROX. 115 FT TO
UNNAMED TRIBUTARY TO BRUSH RUN**

NO ANTICIPATED WETLAND IMPACTS

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APPENDICES

APPENDIX A – FIGURES

APPENDIX B – SOILS FIGURES

APPENDIX C – STANDARD CONSTRUCTION DETAILS

APPENDIX D – STORMWATER BMP MANUAL WORKSHEETS 3, 4, AND 5

APPENDIX E – RECORD OF EXPERIENCE

APPENDIX F – SPILLWAY CALCULATION

EROSION AND SEDIMENTATION CONTROL/STORMWATER MANAGEMENT PLAN

BEDNARSKI FRESH WATER IMPOUNDMENT HOPEWELL TOWNSHIP, WASHINGTON COUNTY, PENNSYLVANIA

1.0 INTRODUCTION

Range Resources – Appalachia, LLC (Range) has prepared this Erosion and Sedimentation Control/Stormwater Management (E&S/SWM) Plan for the Bednarski Fresh Water Impoundment located in Hopewell Township, Washington County. The construction of this site includes the following:

- Construction of a fresh water impoundment; and
- Reclamation of the area following completion of the wells associated with this impoundment and returning the area to the original contours.

A site location map is included in Appendix A.

The proposed construction area is comprised of one drainage area which ultimately discharges to Brush Run. The drainage area is conveyed via sheet flow to an unnamed tributary to Brush Run, which is in the Buffalo Creek Watershed. According to the Chapter 93 Water Quality Standards, Department of Environmental Protection, Title 25 Environmental Resources, Commonwealth of Pennsylvania, Brush Run is classified as a Warm Water Fishery (WWF). The Buffalo Creek Watershed is a High Quality watershed.

This E&S/SWM Plan has been prepared in accordance with the requirements of the PADEP Erosion and Sediment Pollution Control Program Manual dated July 2001. The following sections of this plan present the qualifications of the plan preparer; type, slope, and extent of soils; amount of runoff; E&S/SWM controls; construction sequence; maintenance program; and references.

2.0 QUALIFICATIONS OF PLAN PREPARER

This E&S control plan was prepared by Carla L. Suszkowski, P.E. Ms. Suszkowski has over sixteen (16) years of experience in the preparation of E&S control and stormwater management plans for site development projects located in Pennsylvania, West Virginia, Virginia, Kansas, and Ohio. Ms. Suszkowski's record of training and experience is presented in Appendix E.

3.0 TYPE, SLOPE, AND EXTENT OF SOILS

According to the Soil Survey of Greene and Washington Counties, Pennsylvania, several soil types are present onsite. Figures showing the soils are provided in Appendix B. The soil types are addressed below.

CaD – Culleoka Silt Loam, 15 to 25% slopes:

The Culleoka series consists of moderately deep, well drained soils on uplands. They formed mostly in material weathered from siltstone or sandstone. Typically these soils have a brown silt loam surface layer 9 inches thick. The subsoil from 9 to 27 inches is brown channery silt loam and flaggy silt loam. The substratum from 27 to 33 inches is mottled strong brown and yellowish brown very flaggy silty clay loam.

DtD – Dormont-Culleoka Silt Loams, 15 to 25% slopes and DtF – Dormont-Culleoka Silt Loams, 25 to 50% slopes:

The Culleoka series consists of moderately deep, well drained soils on uplands. They formed mostly in material weathered from siltstone or sandstone. Typically these soils have a brown silt loam surface layer 9 inches thick. The subsoil from 9 to 27 inches is brown channery silt loam and flaggy silt loam. The substratum from 27 to 33 inches is mottled strong brown and yellowish brown very flaggy silty clay loam.

The Dormont series consists of very deep, moderately well drained soils on uplands. They formed in residuum and colluviums consisting of shale, siltstone and some limestone. Typically these soils have a brownish silt loam surface layer 7 inches thick. The upper subsoil from 7 to 25 inches is a brown and yellowish brown silt loam. The pale brown and gray silty clay loam lower subsoil extends from 25 to 53 inches. The substratum from 53 to 72 inches is gray silty clay.

DoC – Dormont Silt Loam, 8 to 15% slopes:

The Dormont series consists of very deep, moderately well drained soils on uplands. They formed in residuum and colluviums consisting of shale, siltstone and some limestone. Typically these soils have a brownish silt loam surface layer 7 inches thick. The upper subsoil from 7 to 25 inches is a brown and yellowish brown silt loam. The pale brown and gray silty clay loam lower subsoil extends from 25 to 53 inches. The substratum from 53 to 72 inches is gray silty clay.

The limiting factors for the site soils have been considered when developing the proposed soil erosion and sedimentation control practices and construction sequences. Immediate seeding and mulching of disturbed areas will aid in soil stabilization and reduce soil erosion once vegetation is established.

The contractor shall take into account the soil encountered during earthmoving activities to establish that suitable material is utilized for the pond embankment construction. Caution should be used in areas where the soil is excessively wet or otherwise unsuitable for embankment construction. The contractor should use the cut and fill slopes designed on the drawings to prevent future issues and use standard construction practices for compaction of the embankment soils.

4.0 AMOUNT OF RUNOFF

The ground cover for the project area in the pre-construction condition is farmed cropland. For the purposes of this plan, the farmed cropland has been modeled as meadow, with a curve number (CN) of 70, representing a good vegetative stand. The ground cover in the post-construction condition will also be farmed cropland; therefore, there is no change from the pre-construction to post-construction conditions. As a result no stormwater calculations have been provided to compare the pre-construction and post-construction conditions.

The intermediate condition will include a lined fresh water impoundment. For the purposes of this plan, the stormwater calculations which have been performed for the post-construction condition are the intermediate condition when the fresh water impoundment is in service.

The impoundment is approximately 290 feet by 350 feet at the top. The impoundment will be constructed with a cut slope on the east side and a fill slope on the west side. The fill slope around the impoundment is modeled with a CN of 82, representing soil with a poor vegetative stand. The area of the cut slope and the impoundment are not included in the post-construction stormwater calculations, due to the fact that any stormwater from these areas will be collected in the impoundment and will not run off the site. As a result, there will be no runoff from this 5.8 acres in the post-construction condition.

Worksheets 3, 4, and 5 from the Pennsylvania Department of Environmental Protection's Stormwater Best Management Practices Manual were used to determine the volume of stormwater runoff from the area for both pre-construction and post-construction conditions. Based on the results of the calculations on these worksheets (Appendix D), the volume of stormwater runoff from the 7.3 acres under pre-construction conditions is 13,331 ft³. The volume of stormwater runoff from under post-construction conditions is 5,826 ft³. Therefore, structural BMPs to control runoff are not required. Completed worksheets 3, 4, and 5 are provided in Appendix D for further information.

5.0 E&S/STORMWATER MANAGEMENT CONTROL MEASURES

The E&S control facilities proposed for the Bednarski fresh water impoundment are shown on the E&S Control Plan in Appendix A. Control measures shown on these figures are minimum controls at approximate locations to protect offsite areas from sediment-laden runoff. Additional controls may be required depending on the progress of construction and the existing conditions encountered.

5.1 SILT FENCE

Silt fence shall be installed in the approximate locations shown on the plans and in accordance with the standard detail provided. Installation requirements are provided on the standard detail included in Appendix C.

Accumulated sediments shall be removed in all cases where accumulations have reached half the above-ground height of the silt fence. If the fence has been damaged, it shall be repaired, or replaced if damaged beyond repair.

5.2 SUPER SILT FENCE

Silt fence shall be installed in the approximate locations shown on the plans and in accordance with the standard detail provided. Installation requirements are provided on the standard detail included in Appendix C.

Accumulated sediments shall be removed in all cases where accumulations have reached half the above-ground height of the silt fence. If the fence has been damaged, it shall be repaired, or replaced if damaged beyond repair.

5.3 VEGETATIVE FILTER STRIPS

A vegetative filter strip consists of a well-vegetated, grassy area below a disturbed area that can be used to remove sediment from runoff prior to its reaching waters of the Commonwealth. To be effective, runoff must be in the form of sheet flow, and the vegetative cover must be established prior to the disturbance. Due to the time required to establish vegetation and the need to control runoff from the areas disturbed while constructing filter strips, constructed vegetative filter strips are not recommended. The suitability of natural vegetative filter strips must be field verified prior to their approval.

Vegetative filter strips may be used to remove sediment from project runoff that is directed to the strip as sheet flow. In order for turnouts from the access road to function correctly, a vegetative filter strip must be constructed at the end of the turnout.

Vegetation must be an existing, well-established, perennial grass. Wooded and brushy areas are not acceptable.

If at any time, the width of the vegetative filter strip has been reduced by sediment deposition to half of its original width, suitable alternative BMPs should be installed immediately.

5.4 OUTFALL PROTECTION

Outfall protection will be installed at the end of the diversion channels as shown on the drawings in Appendix A. Outfall protection will be maintained by replacing rock that is washed away.

5.5 VEGETATIVE COVER

Vegetative cover will be established on all cut and fill slopes during the life of the impoundment. After the use of the impoundment for all associated well sites is complete, the area will be regraded, seeded and mulched. Vegetative cover capable of resisting accelerated erosion and sedimentation will be achieved. Standard seed mixtures, such as those described in the Penn State publication "Erosion Control and Conservation Plantings on "Noncropland" are recommended.

Seed mix will contain more than one variety of seed and will include the application rate. If the area to be vegetated is a steep slope (>3:1), a steep slope mixture will be used. Other limitations, such as droughty or saturated conditions, acid soils, and shaded areas will also be addressed.

Only endophyte free varieties of tall fescue will be used. Seed mixes will include a legume.

The mixes listed below are recommended, but may be substituted depending on site conditions, contractor experience, or landowner requests.

Steep Slopes (3H:1V Slope or Steeper:

Formula and Species	Percent by Weight	Minimum %		Max % Weed Seed	Seeding Rate (lbs per 1,000 sy)
		Purity	Germination		
PennDOT Formula W (Steep Slopes)					10.5 total
Tall Fescue (Festuca Arundinacea var. Kentucky 31)	70	98	85	0.15	7.5
Birdsfoot Trefoil mixture (Lotus corniculatus). A mixture of 50% Viking and 50% of either Empire, Norcen, or Leo	20	98	80*	0.10	2.0
Redtop (Agrostis alba)	10	92	80	0.15	1.0

*Recommended 10% hardseed and 70% normal sprouts. No noxious weed seeds permitted.

Remaining Disturbed Areas

Formula and Species	Percent by Weight	Minimum %		Max % Weed Seed	Seeding Rate (lbs per 1,000 sy)
		Purity	Germination		
PennDOT Formula D					21.0 total
Tall Fescue (Festuca Arundinacea var. Kentucky 31)	70	98	85	0.15	15.0
Creeping Red Fescue or Chewings Fescue	30	98	85	0.15	6.0

Soil amendments shall be applied to all disturbed areas as required to establish vegetative cover. All seeding shall be mulched with hay or straw at the rate of 3 tons / acre (140 lbs. / 1,000 sq. ft.).

Where it is not possible to permanently stabilize a disturbed area immediately after the final earth moving has been completed or where the activity ceases for more than 2 weeks, interim stabilization measures shall be employed. This shall include seeding of disturbed areas with annual rye grass at a rate of approximately 40 lbs/acre and mulching with hay or straw at a rate of approximately 3 tons/acre.

6.0 PRINCIPAL/EMERGENCY SPILLWAY

The area of run-off is the drainage area upslope of the proposed fresh water impoundment. The area is approximately 7.0 acres. The run-off calculation assumes a worst-case scenario utilizing a 100-year, 5-minute peak duration storm event. The rainfall intensity was taken from the PennDOT Storm Frequency Charts for this region. The run-off calculation is as follows:

Drainage Basin:	Meadow
Area of Run-off:	7.0 acres
Rational Run-off Coefficient (C):	0.30 (conservative)
Rainfall Intensity (I):	7.0 inches/hour (100-year frequency/5 minute duration)
Peak Discharge (Q) = $A * C * I$ =	14.7 cfs

The proposed spillway to convey this discharge is a 6-foot wide (minimum) spillway with a crest elevation 2 feet below the top of the embankment of the fresh water impoundment. Assuming the maximum runoff stage through the spillway is 1 foot, the freeboard provided is 1 foot.

The spillway design calculation is provided in Appendix E.

7.0 STAGING OF EARTHMOVING ACTIVITIES

7.1 GENERAL

The Bednarski fresh water impoundment will consist of one (1) general phase of construction. All E&S facilities shall be installed in accordance with the approved E&S/SWM Plan and the DEP Erosion and Sediment Pollution Control Program Manual dated July, 2001.

A generalized construction sequence is provided below. The construction sequence is intended to provide a general course of action in order to conform to the applicable regulatory agency requirements for temporary and permanent soil erosion and sediment pollution control. All necessary parts for proper and complete execution of work pertaining to this plan, whether specifically mentioned or not, are to be performed by the contractor. It is not intended that the drawings and this report show every detailed piece of material or equipment. The contractor shall comply with all requirements listed in this section. The contractor may be required to alter controls based on effectiveness of controls or differing conditions encountered.

7.2 SEQUENCE

1. Limits of disturbance. Stake out the limits of disturbance and note any environmental features to be protected on the site. Utilize orange construction fence or similar protective barrier around areas to be protected (if applicable). Such areas may include, but are not limited to, wetlands, streams, and environmentally sensitive areas.
2. Earthmoving, including construction of the fresh water impoundment. Silt fence and/or super silt fence will be installed below the downslope edge of the work as appropriate. Topsoil will be stockpiled on either side of the proposed impoundment location. The fresh water impoundment will be lined with an impermeable liner.
3. Immediately after construction is completed, all disturbed areas will be seeded and mulched.
4. Install slope stabilization blankets on all embankment slopes exceeding 3H:1V.
5. Upon completion of use of the fresh water impoundment, the site will be restored to its original contour. Topsoil will be redistributed and the site returned to cropland.
6. Remove all temporary erosion and sediment control measures (silt fence, super silt fence, etc.) and any upslope diversion channels.

8.0 MAINTENANCE PROGRAM

All E&S controls shall be maintained in good working order (cleaned, repaired, etc.) until all disturbed tributary areas are stabilized. All temporary E&S controls will remain in place until the disturbed areas have been stabilized.

1. All temporary runoff E&S controls shall be inspected at least after each runoff event to maintain their effectiveness. Any damaged controls shall be repaired or replaced by the end of the working day.
2. Silt Fence and Super Silt Fence: accumulated sediments shall be removed, as required, in all cases where accumulations have reached half the height of the filter fabric. If the silt fence or super silt fence has been damaged, it shall be repaired, or replaced if damaged beyond repair. Adhere to any manufacturer's recommendations.
3. Any diversion channels shall be maintained by removing any accumulated sediment to maintain the design dimensions of the channel. Any rock lining that washes away shall be replaced.
4. Outfall protection shall be maintained by placement of additional rock as necessary following rainfall events.
5. All slopes shall be checked for signs of erosion and/or sedimentation and repaired immediately. As necessary, slopes shall be regarded and reseeded and mulched. Slope stabilization blankets may be installed as necessary.
6. All perimeter locations shall be inspected to ascertain the effectiveness of the controls. Additional control measures shall be implemented as needed.
7. During construction, sediment removed from the erosion control devices shall be disposed of by spreading it at another location on the site which is controlled by approved erosion and sedimentation controls.
8. Site entrance and exit points shall be inspected for evidence of off-site tracking of mud. It is the contractor's responsibility to clean streets of mud and/or dust and take whatever steps are necessary to keep the streets in a clean and dust-free condition.
9. Seeded and vegetated areas shall be checked so that a good stand of vegetation is maintained. Areas shall be fertilized, seeded, and mulched as they are identified. If erosion gullies have formed in vegetated areas, they will be regarded prior to fertilizing, seeding, and mulching.
10. The contractor is responsible for all maintenance and inspections.

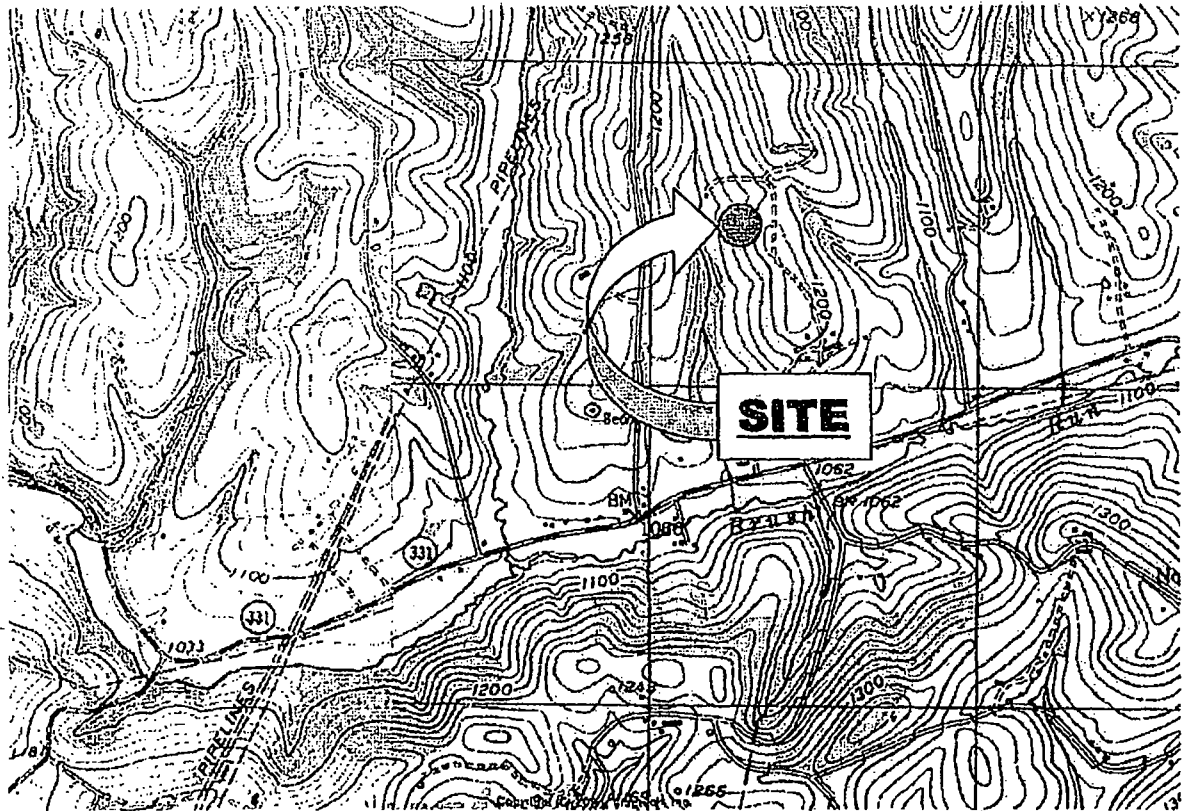
9.0 REFERENCES

1. Commonwealth of Pennsylvania, Pennsylvania Code Title 25, Environmental Resources, Department of Environmental Protection, Chapter 93 Water Quality Standards, Harrisburg, PA, 1994.
2. Commonwealth of Pennsylvania, Department of Environmental Protection, Office of Water Management, Erosion and Sediment Pollution Control Program Manual, Harrisburg, PA, July, 2001.
3. *Web Soil Survey*. Retrieved from the web at <http://websoilsurvey.nrcs.usda.gov/app/>, United States Department of Agriculture, Natural Resources Conservation Service, June 20, 2007.
4. Commonwealth of Pennsylvania, Department of Environmental Protection, Pennsylvania Stormwater Best Management Practices, Harrisburg, PA, December 2006.

APPENDIX A

FIGURES

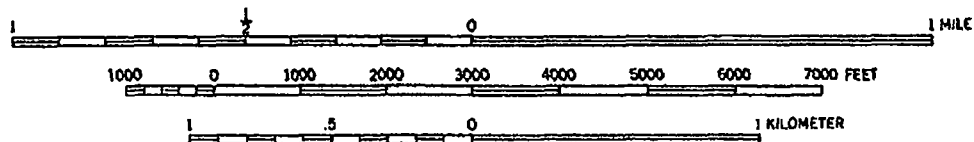
**Bednarski Unit Frack Pit
Hopewell Township, Washington County, PA**



LOCATION MAP

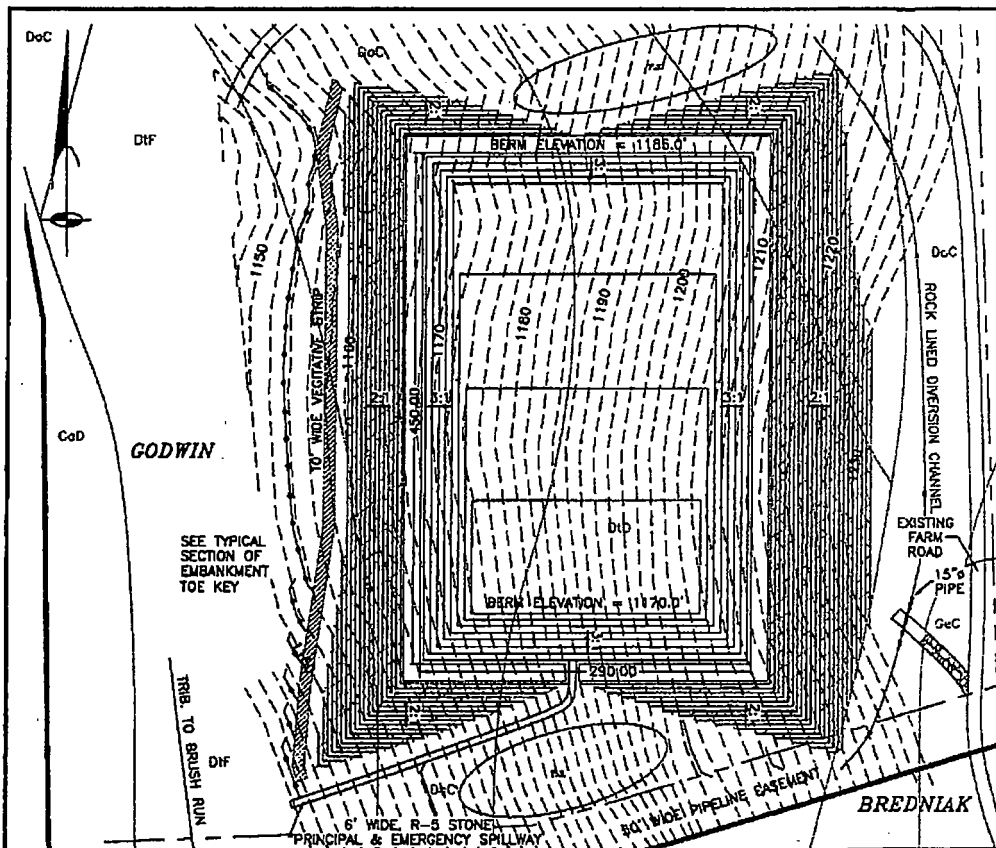
WASHINGTON WEST QUADRANGLE

Scale: 1 : 24000



**CONTOUR INTERVAL 20 FEET
NATIONAL GOEDTIC VERTICAL DATUM OF 1929**

**THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY
DENVER COLORADO 80225 OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST**



LEGEND	
Topsoil Storage	ES
Construction Entrance	Construction Entrance
Filter	Filter
Fence	Fence
Slope Stabilization Blanket	Slope Stabilization Blanket
Property Line	Property Line
Soil Type	Soil Type
Boundary	Boundary

PROPOSED FRACKING POND

BOTTOM ELEVATION: 1185.0'
BERM ELEVATION: 1170.0'

DESIGN INFORMATION:
INSIDE SLOPES: 3:1
OUTSIDE SLOPES: 2:1
POND BOTTOM SLOPE: 1%
BERM WIDTH: 15'



NOTE:

ALL CONTROLS SHOWN ARE APPROXIMATE AND SHOULD BE ADJUSTED TO FIELD CONDITIONS.

ALL COLLECTION / DIVERSION DITCHES ARE TO BE ROCK LINED.

NO EARTH DISTURBANCE IS TO TAKE PLACE WITH IN 100 FEET OF THE TOP OF THE STREAM BANK.



STOP - CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES
THREE WORKING DAYS NOTICE
Pennsylvania One Call System, Inc.
1-800-242-1776

ACT 287 of 1974, as amended by Act 198 of 2004, requires notification by excavators, designers, or any person preparing to disturb the earth's surface anywhere in the Commonwealth call the Pa One Call System, Inc.

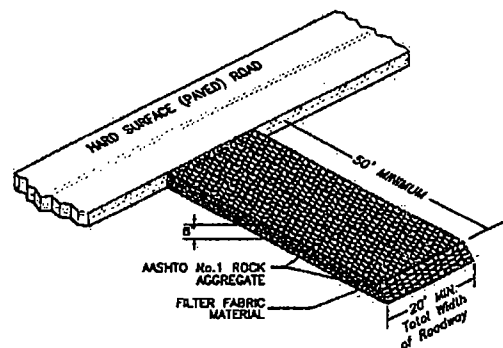
NOTICE REGARDING UNDERGROUND UTILITIES
No warranty is made that this plan shows all existing underground utilities or that the locations of existing utilities shown hereon are the correct locations. The depiction of utilities herein does not relieve the contractor(s) who will be performing excavations from complying with Pennsylvania law regarding excavations, said requirements can be satisfied, in part, by contacting the POCs at 1-800-242-1776.

NOTICE
If site conditions encountered during construction differ from those shown on this plan, contact TRI-COUNTY ENGINEERING at (724) 832-8814 before proceeding further.

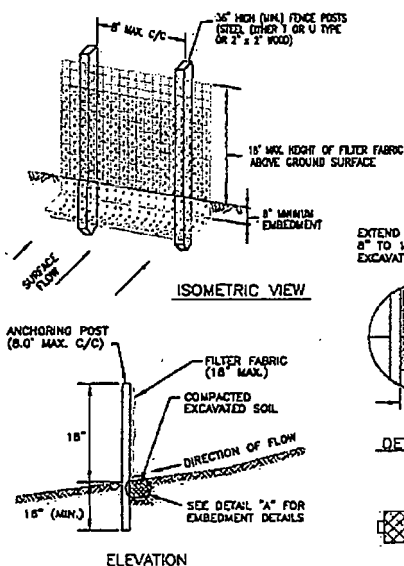
REVISED	COMMENTS

TRI - COUNTY ENGINEERING, LLC
 820 SOUTH MAIN STREET
 GREENSBURG, PA. 15601
 VOICE: 724 / 832-8814 FAX: 724 / 834-4128

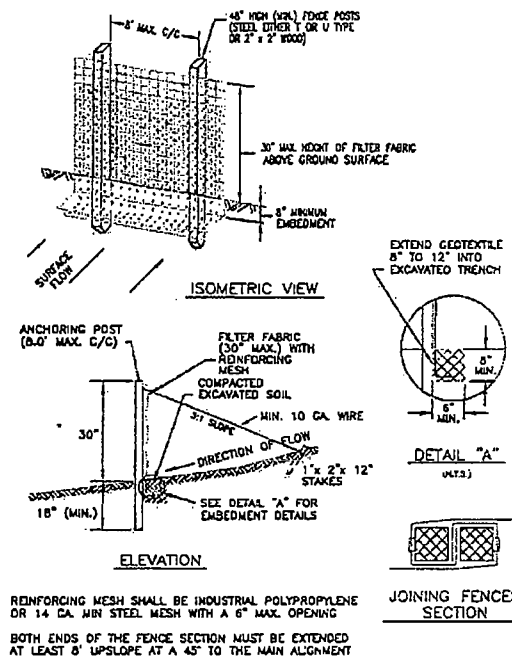
**PROPOSED FRACKING POND
BEDNARSKI UNIT**
RANGE RESOURCES - APPALACHIA LLC
 DRAWN BY: RAM DATE: 9/24/08
 SCALE: 1" = 100' SHEET: E&S-1 FILE NO.: 1768-83



CONSTRUCTION ENTRANCE
(N.T.S.)



18" SILT FENCE
(N.T.S.)



30" SILT FENCE
(N.T.S.)

STOP - CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES
THREE WORKING DAYS NOTICE
Pennsylvania One Call System, Inc.

1-800-242-1776

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REVISED	COMMENTS

TRI - COUNTY ENGINEERING, LLC

VOICE: 724 / 832-8814

820 SOUTH MAIN STREET
GREENSBURG, PA. 15601

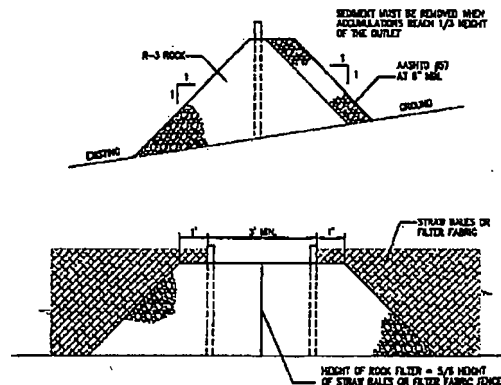
FAX: 724 / 834-4128



**PROPOSED FRACKING POND
BEDNARSKI UNIT**

RANGE RESOURCES - APPALACHIA LLC

DRAWN BY: RAM	DATE: 9/24/08	HOPEWELL TOWNSHIP WASHINGTON COUNTY
SCALE: N.T.S.	SHEET: E&S-2	FILE NO. 1769-83



5
3 ROCK FILTER OUTLET
(N.T.S.)

II. **Pumped Water Filter Bags** may be used to filter water pumped from disturbed areas prior to discharging to waters of the Commonwealth. They may also be used to filter water pumped from the sediment storage areas of Sediment Basins and Traps.

A. **DESIGN RESTRICTIONS**

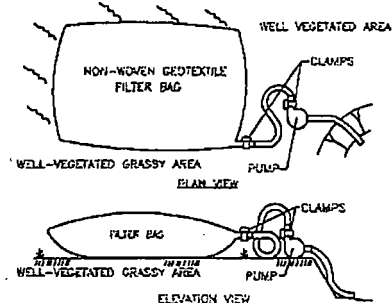
1. Filter bags should be capable of trapping particles larger than 150 microns.
2. The Pumping Rate should not exceed the design maximum pumping rate specified by the manufacturer but in no case shall exceed a rate of 750 gallons per minute.
3. A suitable means of accessing the bag with machinery for purposes of disposal should be provided.
4. Filter Bags should not be placed on any slope greater than 6%.
5. Filter bags should discharge onto stable, erosion resistant areas.

B. **INSTALLATION**

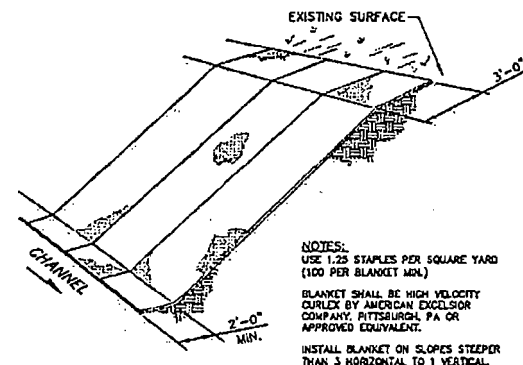
1. Filter bags should be installed in accordance with the manufacturer's specifications.
2. The Pump Discharge Hose should be inserted into a corner of the bag and securely clamped prior to initiating pumping.

C. **MAINTENANCE**

1. At minimum, Filter Bags should be Inspected Daily and After Each Runoff Event to ensure that they are working properly.
2. If any problem is detected, Pumping Should Cease Immediately and not resume until the problem is corrected.



5
4 GEOTEXTILE FILTER BAG
(N.T.S.)



NOTES:
USE 1.25 STAPLES PER SQUARE YARD
(100 PER BLANKET MDL.)
BLANKET SHALL BE HIGH VELOCITY
DURLEX BY AMERICAN EXCELSIOR
COMPANY, PITTSBURGH, PA OR
APPROVED EQUIVALENT.
INSTALL BLANKET ON SLOPES STEEPER
THAN 3 HORIZONTAL TO 1 VERTICAL.

5
5 EROSION CONTROL
BLANKET INSTALLATION
(N.T.S.)

STOP - CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES
THREE WORKING DAYS NOTICE
Pennsylvania One Call System, Inc.

1-800-242-1776

ACT 287 of 1974, as amended by Act 199 of 2004, requires notification by excavators, designers, or any person preparing to disturb the earth's surface anywhere in the Commonwealth call the Pa One Call System, Inc.

NOTICE REGARDING UNDERGROUND UTILITIES
No warranty is made that this plan shows all existing underground utilities or that the locations of existing utilities shown hereon are the correct locations. The depiction of utilities herein does not relieve the contractor(s) who will be performing excavations from complying with Pennsylvania law regarding excavations, said requirements can be satisfied, in part, by contacting the POCs at 1-800-242-1776.

NOTICE
If site conditions encountered during construction differ from those shown on this plan, contact TRI-COUNTY ENGINEERING at (724) 832-8814 before proceeding further.

REVISED	COMMENTS

TRI - COUNTY ENGINEERING, LLC

VOICE: 724 / 832-8814

820 SOUTH MAIN STREET
GREENSBURG, PA 15601

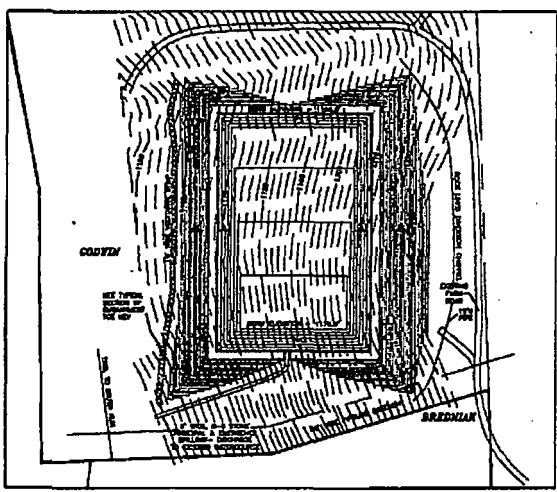
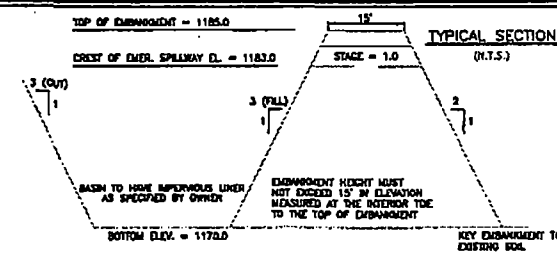
FAX: 724 / 834-4128



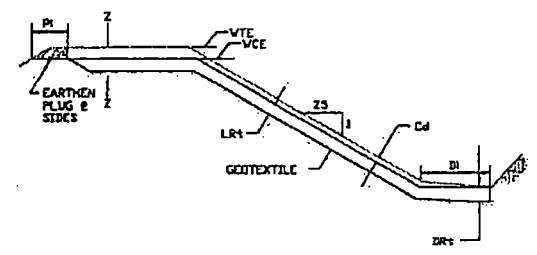
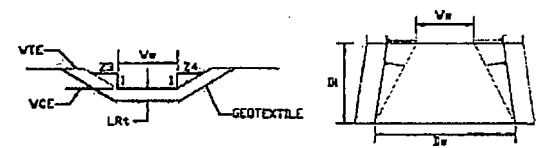
**PROPOSED FRACKING POND
BEDNARSKI UNIT**

RANGE RESOURCES - APPALACHIA LLC

DRAWN BY: RAM	DATE: 9/24/08	HOPWELL TOWNSHIP WASHINGTON COUNTY
SCALE: N.T.S.	SHEET: E&S-3	FILE NO. 1769-83



FRACKING POND

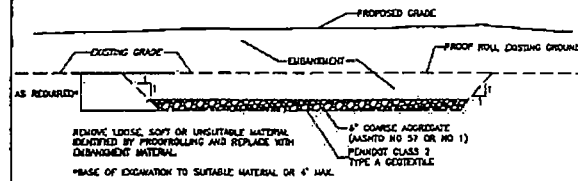
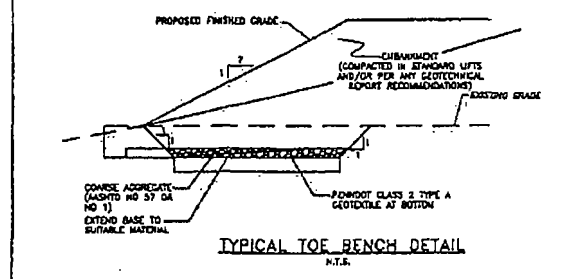


THE CHANNEL SECTION OF THE EMERGENCY SPILLWAY SHALL BE LINED WITH:
R-3 (MIN.) RIPRAP

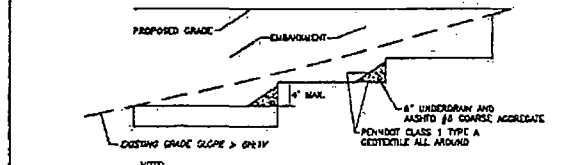
BASIN NO.	WIDEN		LIFTING		CHANNEL		DISSIPATOR	
	23 (FT)	24 (FT)	TOP ELEV (FT)	CRST ELEV (FT)	WIDTH (FT)	DEPTH (FT)	LENGTH (FT)	WIDTH (FT)
1	3	3	1183.0	1183.0	5	5	27	8.3
								20
								24
								R-3
								27

* Dimension P1 should be 5' minimum.

FRACKING BASIN EMERGENCY SPILLWAY
(N.T.S.)



OVER-EXCAVATION OF UNSUITABLE MATERIALS DETAIL
(N.T.S.)



TYPICAL KEY BENCH DETAIL
(N.T.S.)

STOP - CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES
THREE WORKING DAYS NOTICE
Pennsylvania One Call System, Inc.

1-800-242-1776

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REVISED	COMMENTS

TRI - COUNTY ENGINEERING, LLC
820 SOUTH MAIN STREET
GREENSBURG, PA. 15601
VOICE: 724 / 832-8814 FAX: 724 / 834-4128



PROPOSED FRACKING POND BEDNARSKI UNIT			
RANGE RESOURCES - APPALACHIA LLC			
DRAWN BY: RAM	DATE: 9/24/08	HOPEWELL TOWNSHIP WASHINGTON COUNTY	
SCALE: N.T.S.	SHEET: E&S-4	FILE NO. 1769-83	

APPENDIX B
SOILS FIGURES

Soil Map--Greene and Washington Counties, Pennsylvania
(Bednarski Unit Frack Pond)



Natural Resources
Conservation Service


Web Soil Survey 2.0
National Cooperative Soil Survey

8/24/2008
Page 1 of 3

Soil Map—Greene and Washington Counties, Pennsylvania
(Bednarski Unit Frack Pond)

MAP LEGEND






















Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Units

Special Point Features




-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot

 Very Stony Spot



 Wet Spot

 Other

Special Line Features

-  Gully
-  Short Steep Slope
-  Other







Political Features

- Municipalities**
-  Cities
-  Urban Areas

Water Features

-  Oceans
-  Streams and Canals

Transportation

-  Rails
- Roads**
-  Interstate Highways
-  US Routes
-  State Highways
-  Local Roads
-  Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: UTM Zone 17N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Greene and Washington Counties, Pennsylvania

Survey Area Data: Version 4, Feb 1, 2008

Date(s) aerial images were photographed: 4/7/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.



Natural Resources
Conservation Service

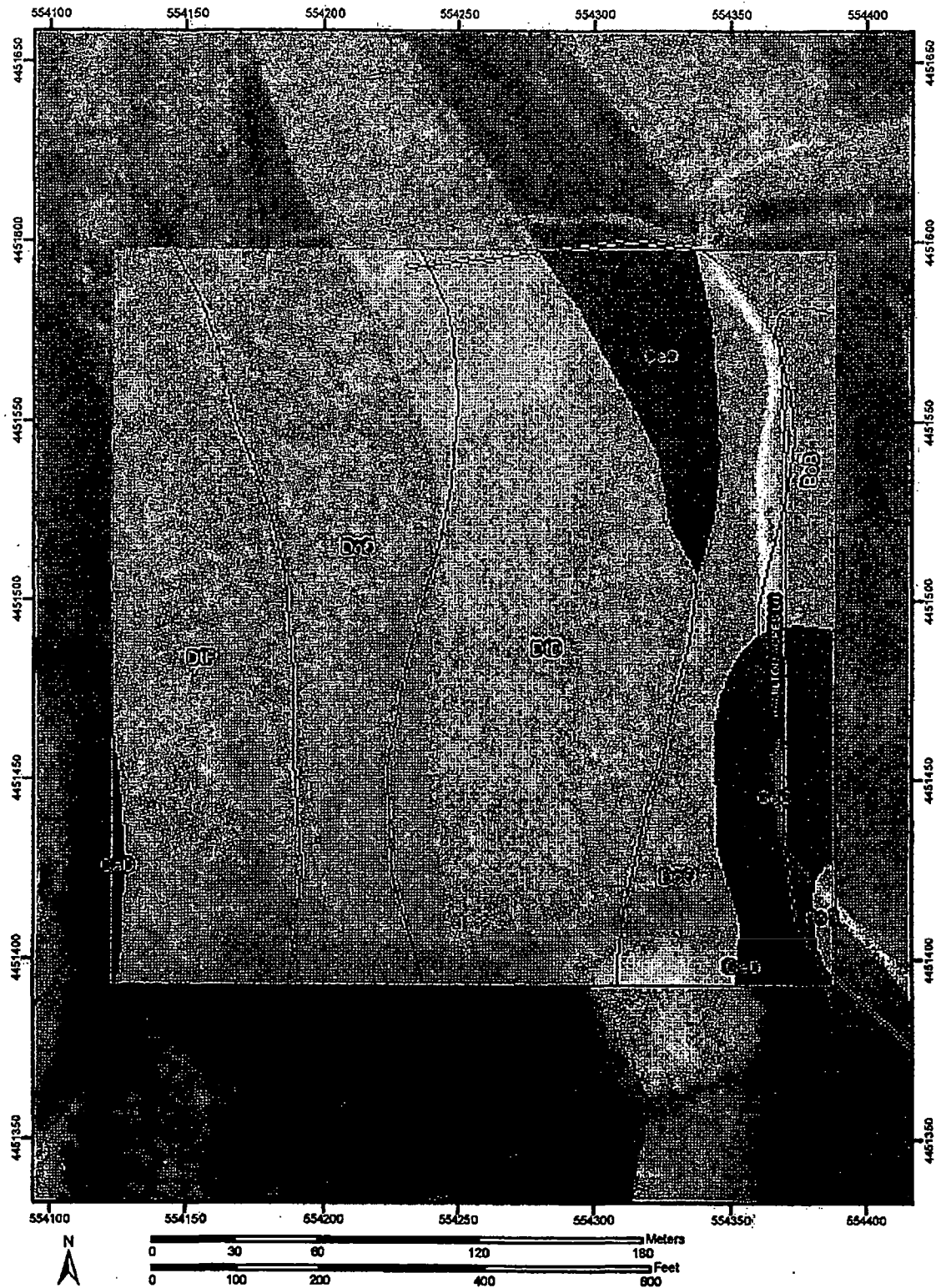
Web Soil Survey 2.0
National Cooperative Soil Survey

9/24/2008
Page 2 of 3

Map Unit Legend

Greene and Washington Counties, Pennsylvania (PA611)			
Map Unit Symbol	Map Unit Name	Acres (in AOI)	Percent of AOI
BoB	Brooke silty clay loam, 3 to 8 percent slopes	0.7	3.7%
CaD	Culleoka silt loam, 15 to 25 percent slopes	1.0	5.4%
DoC	Dormont silt loam, 8 to 15 percent slopes	5.8	32.5%
DiD	Dormont-Culleoka silt loams, 15 to 25 percent slopes	5.5	30.7%
DiF	Dormont-Culleoka silt loams, 25 to 50 percent slopes	3.7	20.9%
GeC	Guernsey silt loam, 8 to 15 percent slopes	1.2	6.7%
GeD	Guernsey silt loam, 15 to 25 percent slopes	0.0	0.1%
Totals for Area of Interest (AOI)		17.9	100.0%

Embankments, Dikes, and Levees—Greene and Washington Counties, Pennsylvania
(Bednarski Unit Frack Pond)



Natural Resources
Conservation Service


Web Soil Survey 2.0
National Cooperative Soil Survey

9/24/2008
Page 1 of 4

**Embankments, Dikes, and Levees—Greene and Washington Counties, Pennsylvania
(Bednarski Unit Frack Pond)**

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Units

Soil Ratings

 Very limited


 Somewhat limited

 Not limited

 Not rated or not available


Political Features

Municipalities

 Cities

 Urban Areas

Water Features

 Oceans

 Streams and Canals

Transportation

 Rails

Roads

 Interstate Highways

 US Routes

 State Highways

 Local Roads

 Other Roads

MAP INFORMATION

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Survey Area Data: Version 4, Feb 1, 2008

Date(s) aerial images were photographed: 4/7/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Embankments, Dikes, and Levees

Embankments, Dikes, and Levees—Summary by Map Unit—Greene and Washington Counties, Pennsylvania						
Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (rating values)	Acres in AOI	Percent of AOI
BoB	Brooke silty clay loam, 3 to 8 percent slopes	Somewhat limited	Brooke (100%)	Thin layer (0.86) Hard to pack (0.11)	0.7	3.7%
CaD	Culleoka silt loam, 15 to 25 percent slopes	Very limited	Culleoka (80%)	Piping (1.00) Thin layer (0.83)	1.0	5.4%
DoC	Dormont silt loam, 8 to 15 percent slopes	Somewhat limited	Dormont (70%)	Depth to saturated zone (0.75) Piping (0.43)	5.8	32.5%
DiD	Dormont-Culleoka silt loams, 15 to 25 percent slopes	Somewhat limited	Dormont (45%)	Depth to saturated zone (0.75) Piping (0.43)	5.5	30.7%
DIF	Dormont-Culleoka silt loams, 25 to 60 percent slopes	Somewhat limited	Dormont (55%)	Depth to saturated zone (0.75) Piping (0.35)	3.7	20.9%
GeC	Guernsey silt loam, 8 to 15 percent slopes	Very limited	Guernsey (80%)	Depth to saturated zone (1.00) Hard to pack (0.04) Thin layer (0.01)	1.2	6.7%
GeD	Guernsey silt loam, 15 to 25 percent slopes	Very limited	Guernsey (75%)	Depth to saturated zone (1.00) Hard to pack (0.04) Thin layer (0.01)	0.0	0.1%
Totals for Area of Interest (AOI)					17.9	100.0%

Embankments, Dikes, and Levees—Summary by Rating Value		
Rating	Acres in AOI	Percent of AOI
Somewhat limited	15.7	87.8%
Very limited	2.2	12.2%

Description

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. The soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the suitability of the undisturbed soil for supporting the embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Rating Options

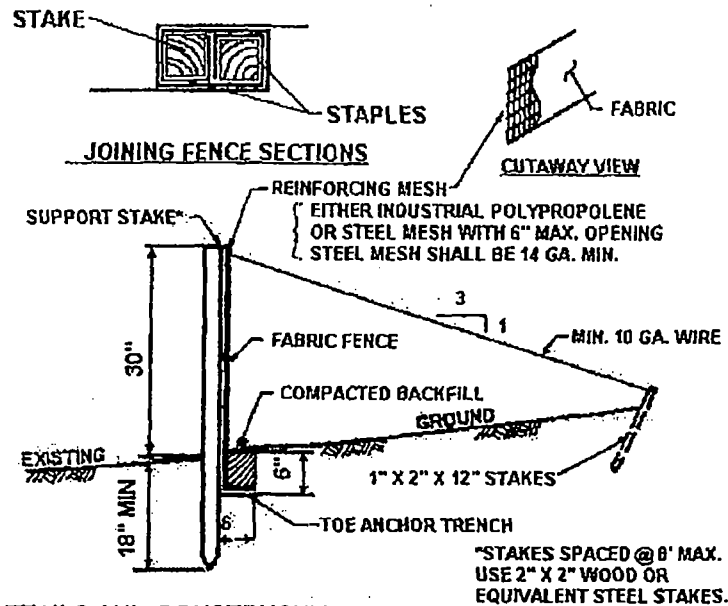
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX C
STANDARD CONSTRUCTION DETAILS

STANDARD CONSTRUCTION DETAIL # 20 **Reinforced Filter Fabric Fence (30" High)**



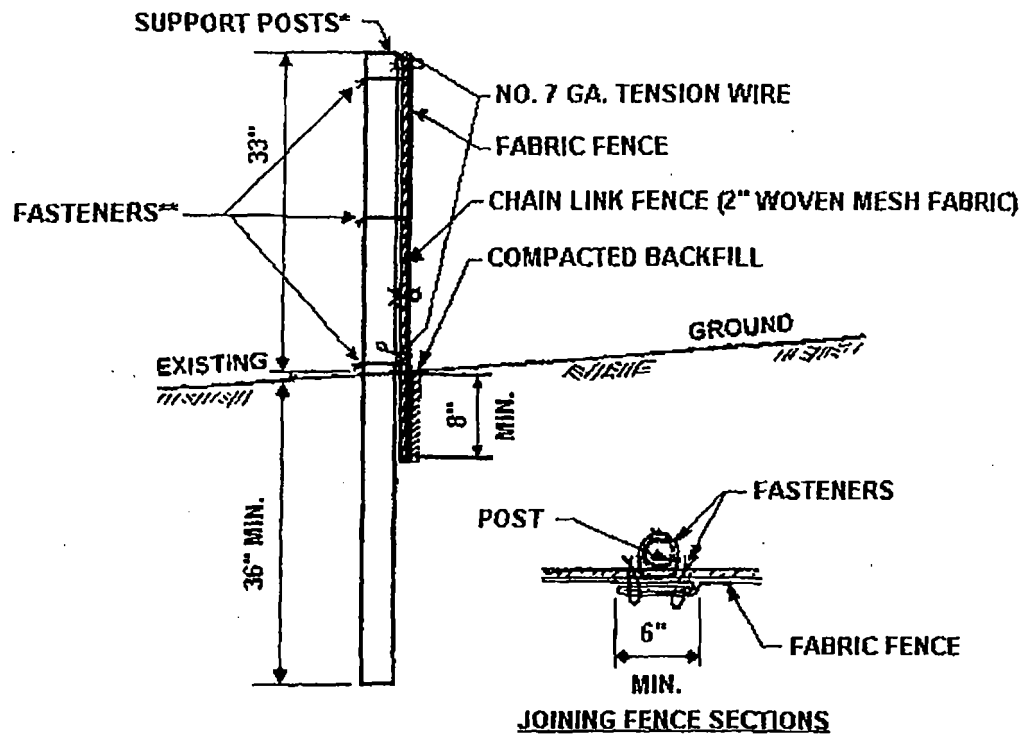
**NOTE: SHOW ALL DETAILS AND CONSTRUCTION
DIMENSIONS ON PLAN DRAWINGS.**

Filter fabric fence must be installed at existing level grade. Both ends of each fence section must be extended at least 8 feet upslope at 45 degrees to the main fence alignment.

Sediment must be removed where accumulations reach 1/2 the above ground height of the fence.

Any fence section which has been undermined or topped must be immediately replaced with a rock filter outlet. See Standard Construction Detail # 18.

STANDARD CONSTRUCTION DETAIL # 22
Super Filter Fabric Fence



* Posts spaced @ 10' max. Use 2 1/2" dia. galvanized or aluminum posts.

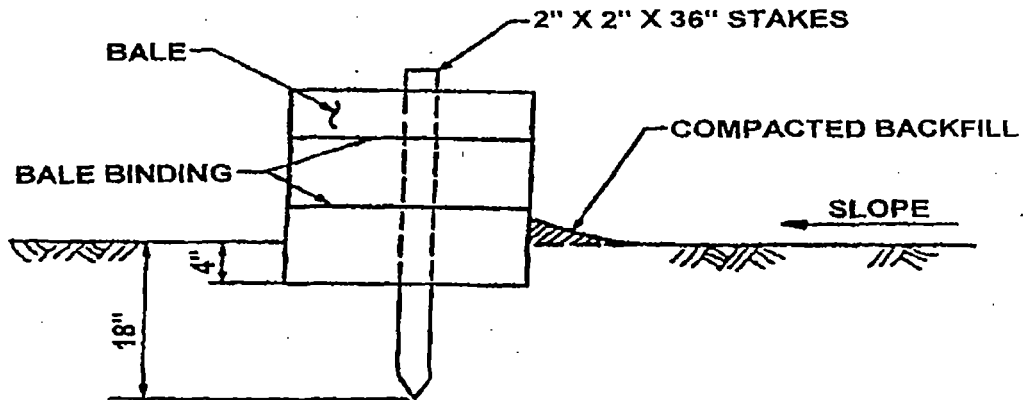
** Chain Link To Post Fasteners spaced @ 14" max. Use No. 6 Ga. aluminum wire or No. 9 galvanized steel pre-formed clips. Chain Link To Tension Wire Fasteners spaced @ 60" max. Use No. 10 Ga. galvanized steel wire. Fabric To Chain Fasteners spaced @ 24" max. C to C.

No. 7 Ga. Tension Wire installed horizontally at top and bottom of chain-link fence.

Filter Fabric Fence must be placed at existing level grade. Both ends of the barrier must be extended at least 8 feet upslope at 45 degrees to main barrier alignment.

Sediment must be removed when accumulations reach 1/2 the above ground height of the fence.

STANDARD CONSTRUCTION DETAIL #17 **Straw Bale Barriers**



Straw Bale Barriers should not be used for more than 3 months.

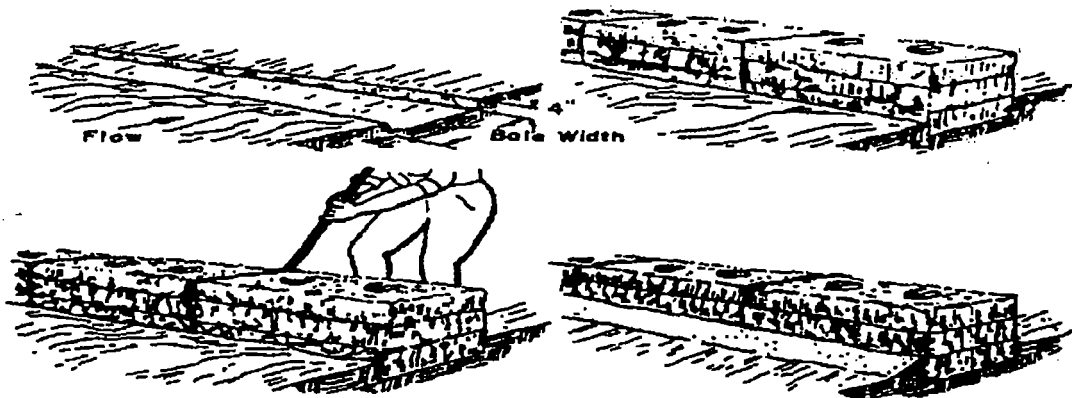
Straw Bale Barriers shall be placed at existing level grade. Both ends of the barrier shall be extended at least 8 feet up slope at 45 degrees to the main barrier alignment.

Sediment shall be removed when accumulations reach 1/3 the above ground height of the barrier.

Any section of Straw Bale Barrier which has been undermined or topped shall be immediately replaced with a Rock Filter Outlet. See Standard Construction Detail #18.

1. EXCAVATE THE TRENCH.

2. PLACE AND STAKE STRAW BALES.



2. WEDGE LOOSE STRAW BETWEEN BALES.

4. BACKFILL AND COMPACT THE EXCAVATED SOIL. (ANCHOR TOE)

APPENDIX D
STORMWATER BMP MANUAL
WORKSHEETS 3, 4, AND 5

Worksheet 3: Nonstructural BMP Credits			
PROTECTED AREA			
1.1 Area of Protected Sensitive/Special Value Features (see WS 2)		0	Ac.
1.2 Area of Riparian Forest Buffer Protection		0	Ac.
3.1 Area of Minimum Disturbance/Reduced Grading		0	Ac.
TOTAL			0 Ac.
<div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> Site Area <div style="border: 1px solid black; width: 60px; text-align: center; margin: 5px;">7.3</div> </div> <div style="text-align: center;"> <i>minus</i> - </div> <div style="text-align: center;"> Protected Area <div style="border: 1px solid black; width: 60px; text-align: center; margin: 5px;">0</div> </div> <div style="text-align: center;"> = </div> <div style="text-align: center;"> Stormwater Management Area <div style="border: 1px solid black; width: 120px; text-align: center; margin: 5px;">7.3</div> </div> </div> <div style="margin-top: 5px;"> <p style="font-size: small; text-align: center;">This is the area that requires stormwater management</p> </div> </div>			
VOLUME CREDITS			
3.1 Minimum Soil Compaction			
Lawn	_____ ft ²	x 1/4" x 1/12 =	_____ ft ³
Meadow	_____ ft ²	x 1/3" x 1/12 =	_____ ft ³
3.3 Protect Existing Trees			
<i>For Trees within 100 feet of Impervious area:</i>			
Tree Canopy	_____ ft ²	x 1/2" x 1/12 =	_____ ft ³

5.1 Disconnect Roof Leaders to Vegetated Areas			
<i>For runoff directed to areas protected under 5.8.1 and 5.8.2</i>			
Roof Area	_____ ft ²	x 1/3" x 1/12 =	_____ ft ³
<i>For all other disconnected roof areas</i>			
Roof Area	_____ ft ²	x 1/4" x 1/12 =	_____ ft ³
5.2 Disconnect Non-Roof Impervious to Vegetated Areas			
<i>For Runoff directed to areas protected under 5.8.1 and 5.8.2</i>			
Impervious Area	_____ ft ²	x 1/3" x 1/12 =	_____ ft ³
<i>For all other disconnected roof areas</i>			
Impervious Area	_____ ft ²	x 1/4" x 1/12 =	_____ ft ³
<div style="border: 1px solid black; width: 100px; height: 20px; display: flex; align-items: center; justify-content: center;"> <div style="background-color: #cccccc; width: 70px;"></div> <div style="width: 30px; text-align: center; margin-left: 5px;">0</div> </div>			

* For use on Worksheet 5

WORKSHEET 4. CHANGE IN RUNOFF VOLUME FOR 2-YR STORM EVENT

PROJECT: Bednarski Impoundment
 Drainage Area: _____
 2-Year Rainfall: 2.6 in

Total Site Area: 7.3 acres
 Protected Site Area: 0 acres
 Managed Area: 7.3 acres

$$S = \left(\frac{1000}{70} \right) - 10$$

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff ¹ (in)	Runoff Volume ² (ft ³)
Woodland								
Meadow	C	317,988	7.3	70	4.29	0.86	0.50	13,331
Impervious								
TOTAL:		317,988	7.3					13,331

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff ¹ (in)	Runoff Volume ² (ft ³)
Meadow	C	65,340	1.5	82	2.19	0.44	1.07	5,826
Impoundment/cut Slope	C	252,648	5.8	0	0	0	0	0
TOTAL:		317,988	7.3					5,826

2-Year Volume Increase (ft³): 0

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = $Q = (P - 0.2S)^2 / (P + 0.8S)$ where
- P = 2-Year Rainfall (in)
- S = $(1000 / CN) - 10$
2. Runoff Volume (CF) = $Q \times \text{Area} \times 1/12$
- Q = Runoff (in)
- Area = Land use area (sq. ft)

$$Q_{pre} = \frac{(2.6 - 0.2(4.29))^2}{(2.6 + 0.8(4.29))} = 0.50$$

$$Q_{post} = \frac{(2.6 - 0.2(2.19))^2}{(2.6 + 0.8(2.19))} = 1.07$$

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

WORKSHEET 5: STRUCTURAL BMP VOLUME CREDITS

PROJECT: Bednarski Fresh Water Impoundment
 SUB-BASIN: _____

Required Control Volume (ft³) - from Worksheet 4: -7,505
 Non-structural Volume Credit (ft³) - from Worksheet 3: 0
 Structural Volume Reqmt (ft³) -7,505
 (Required Control Volume minus Non-structural Credit)

Proposed BMP	Area (ft ²)	Storage Volume (ft ³)
6.4.1 Porous Pavement		
6.4.2 Infiltration Basin		
6.4.3 Infiltration Bed		
6.4.4 Infiltration Trench		
6.4.5 Rain Garden/Bioretentation		
6.4.6 Dry Well / Seepage Pit		
6.4.7 Constructed Filter		
6.4.8 Vegetated Swale		
6.4.9 Vegetated Filter Strip		
6.4.10 Berm		
6.5.1 Vegetated Roof		
6.5.2 Capture and Re-use		
6.6.1 Constructed Wetlands		
6.6.2 Wet Pond / Retention Basin		
6.6.3 Dry Extended Detention Basin		
6.6.4 Water Quality Filters		
6.7.1 Riparian Buffer Restoration		
6.7.2 Landscape Restoration / Reforestation		
6.7.3 Soil Amendment		
6.8.1 Level Spreader		
6.8.2 Special Storage Areas		
Other		

Total Structural Volume (ft³): 0
 Structural Volume Requirement (ft³): 0
 DIFFERENCE 0

APPENDIX E
RECORD OF EXPERIENCE

STANDARD WORKSHEET #2
RECORD OF TRAINING AND EXPERIENCE
IN EROSION AND SEDIMENTATION CONTROL METHODS AND TECHNIQUES

NAME OF PLAN PREPARER: Carla L. Suszkowski, P.E.**FORMAL EDUCATION:**

Name of College of Technical Institute: University of Pittsburgh
Curriculum or program: Civil Engineering
Dates of Attendance: From: 9/88 to: 4/92
Degree received: BS, Civil Engineering - 1992

OTHER TRAINING:

Name of Training: Advanced Design Methods for Selecting E&S Control BMPs
Presented by: International Erosion Control Association
Date: 1996

EMPLOYMENT HISTORY:

Current Employer: Range Resources - Appalachia, LLC
Telephone: (724) 873 - 3226

Former Employer: Civil & Environmental Consultants, Inc.
Telephone: (412) 429 - 2324

RECENT EROSION AND SEDIMENTATION CONTROL PLANS PREPARED:

Name of Project	<u>Morgan AM&T Captive Disposal Area Parking Lot</u>	<u>Phoenix Resources, Inc. C&D Landfill</u>	<u>Mostoller Landfill, Inc. Clay Borrow Area</u>
County:	<u>Potter</u>	<u>Tioga</u>	<u>Somerset</u>
Municipality:	<u>Eulalia Township</u>	<u>Duncan Township</u>	<u>Somerset and Brothers Valley Townships</u>
Permit Number: (If Applicable)	<u></u>	<u></u>	<u></u>
Approving Agency:	<u>PaDEP</u>	<u>PaDEP</u>	<u>PaDEP</u>

APPENDIX F
SPILLWAY CALCULATION

Basin #1 Emergency Spillway Discharge Capacity

Project : Bednarski Unit Frack Pond
Location : Hopewell Township, Washington County, PA
Prepared by : RAM

Job No. : GLE1769-83
Date : 24-Sep-08
Page : 1 of 1

**Weir
Flow**

$$Q = C L H^{1.5}$$

Q = Discharge in cu.ft.

17.4

C = Weir Coefficient

2.9

L = Weir Length

6.0

H = Head above Weir Crest

1.0

Principal Spillway Capacity (sum of temporary and permanent risers) =

N/A

TOTAL OUTFLOW=

17.4



On Call. On Time. On Target.

THE GATEWAY ENGINEERS, INC.

400 HOLIDAY DRIVE, SUITE 300
PITTSBURGH, PA 15220-2727
412.921.4050 PHONE
412.921.9960 FAX

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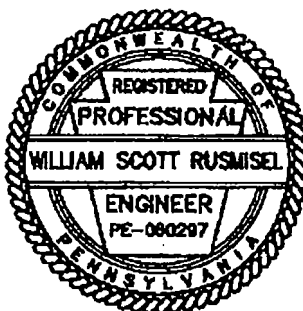
EROSION AND SEDIMENTATION CONTROL PLAN NARRATIVE

Made For

**RANGE RESOURCES – APPALACHIA, LLC
KERNS FRESH WATER IMPOUNDMENT**

Situate In

**HOPEWELL TOWNSHIP
WASHINGTON COUNTY, PA**



RECEIVING STREAM (USGS BLUE LINE): BRUSH RUN (WWF)

DISTANCE TO NEAREST USGS BLUE LINE STREAM: 400 FT.

NO ANTICIPATED WETLAND IMPACTS

C-17523-0002

Date: December 30, 2008

Revised: January 22, 2009

THE GATEWAY ENGINEERS, INC.

Prepared By: Laura M. Rusmisl, E.I.T.

Reviewed By: W. Scott Rusmisl, P.E.

EROSION AND SEDIMENTATION CONTROL PLAN NARRATIVE

PLAN NAME: Kerns Fresh Water Impoundment

LOCATION: Hopewell Township, Washington County, PA.

Chapter 93 Watershed Classification: receiving stream is an Unnamed Tributary to Brush Run and is classified as a High Quality Warm Water Fishery (HQ-WWF)

Past and Present Land Uses: The site proposed for construction of the Impoundment has historically and is currently farmed for hay.

The following narrative is accordance with PA Title 25, Chapter 102 Rules and Regulations, Section 102.5:

102.5 (b) The erosion and sedimentation control plan shall be designed to prevent accelerated erosion and sedimentation and shall consider all factors which contribute to erosion and sedimentation including, but not limited to, the following:

102.5(b)(1) The topographic features of the project area.

Existing contours are shown on the attached Erosion and Sedimentation Control Plan at 2 foot intervals.

102.5(b)(2) The types, depth, slope and aerial extent of the soils.

Refer to Appendix B for on-site soils information.

102.5(b)(3) The proposed alteration to the area.

The proposed alterations to the project area include construction of a fresh water impoundment for use in fracturing the Marcellus shale gas wells. The proposed development will disturb approximately 9.9+/- acres.

(a) Explain erosion and sedimentation control function of permanent site features and/or facilities.

Any unpaved disturbed area will be seeded with a mixture specified in the planting specifications.

(b) Indicate how and where topsoil will be removed, temporarily stockpiled, and then replaced.

Topsoil will be stripped and stockpiled on-site at the approximate locations shown on the Erosion & Sedimentation Control Plan. Stockpiled topsoil will be utilized when returning the site to original conditions.

102.5 (b)(4) The amount of runoff from the project area and the upstream watershed area and the method of calculation used.

(a) Watershed boundaries on and off site.

The watershed boundaries are shown by the existing topography and proposed grades on the Erosion and Sedimentation Control Plan.

(b) Show that all discharge points are in compliance with section 102.13 with regard to allowable velocity.

No new point discharges will be created.

102.5 (b)(5) The staging of earthmoving activities.

(a) Construction Sequence

The Kerns Fresh Water Impoundment will consist of one (1) general phase of construction. All E&S facilities shall be installed in accordance with the approved E&S/SWM Plan and the DEP Erosion and Sediment Pollution Control Program Manual dated July, 2001 or latest version.

A generalized construction sequence is provided below. The construction sequence is intended to provide a general course of action in order to conform to the applicable regulatory agency requirements for temporary and permanent soil erosion and sediment pollution control. All necessary parts for proper and complete execution of work pertaining to this plan, whether specifically mentioned or not, are to be performed by the contractor. It is not intended that the drawings and this report show every detailed piece of material or equipment. The contractor shall comply with all requirements listed in this section. The contractor may be required to alter controls based on effectiveness of controls or differing conditions encountered.

- 1. Stake out limit of disturbance for grading operations. In addition, orange construction fence shall be placed around any and all environmental features to be protected on the site.**
- 2. Install rock construction entrance according to the detail provided in the location shown on the plan.**
- 3. Install super silt fence as shown on the plan below areas of proposed disturbance.**

4. Clear area for construction of Temporary Diversion Channels, DCT-1A and DCT-1B and cross drain at site entrance. Install channels according to the detail provided; immediately install protective lining as specified.
5. Install 30" silt fence below area of proposed Temporary Sediment Trap 1.
6. Clear and remove topsoil at the proposed area of Temporary Sediment Trap 1 and stockpile at the nearest location as shown on the plan.
7. Begin construction of Temporary Sediment Trap 1 as shown on the plan. Verify soil from the excavation of Trap 1 for suitability as embankment material. Geotechnical engineer may verify soil capabilities. As soon as embankment is brought to final grade, immediately seed and mulch for stabilization in regular 10' vertical increments to promote early stabilization of the fill slope.
8. Complete construction of Temporary Sediment Trap 1, install clean out stake and complete seeding and mulching of all exterior trap slopes.
9. Begin construction of Temporary Interceptor Channels, ICT-1A and ICT-1B, in the locations shown and according to the details provided on the plan. Install channel liners and seed and mulch for stabilization.
10. Clear and grub remainder of site within limits of disturbance as shown on the plans.
11. Clear topsoil from the area of the proposed Fresh Water Impoundment and stockpile at the nearest locations as shown on the plan. Immediately install 30" filter fabric fence below topsoil stockpiles.
12. Begin construction of Fresh Water Impoundment as shown on plans. Verify soil from the excavation of Fresh Water Impoundment for suitability as embankment material. Geotechnical engineer may verify soil capabilities. As soon as embankment is brought to final grade, immediately install erosion control blanket and seed and mulch for stabilization in regular 15' vertical increments to promote early stabilization of the slopes.
13. Install emergency spillway and impermeable pond liner according to the detail and specifications provided.
14. Construct rock pad on pond embankment in the location shown for staging pumping equipment.
15. Complete construction of Fresh Water Impoundment and complete seeding and mulching of all exterior basin slopes.
16. Fresh Water Impoundment shall remain in operation as needed. Once drilling operations have been complete, the Fresh Water Impoundment shall be removed. Dewater the Fresh Water Impoundment and commence grading operations to fill pond. Grading shall restore the site to the condition and grade prior to impoundment construction.
17. Replace topsoil, seed and mulch all disturbed areas, using the specified seeding requirements found on the detailed plan. All disturbed areas must be temporarily stabilized if remaining idle, or anticipated to remain idle. In the absence of a soil test, lime should be added at a rate of 275 lbs / 1000 s.f. Likewise, the fertilizer rates should be increased to 1250 lbs/ac. of 8-16-16 and 2000 lbs/ac. of 5-10-10.
18. Remove Temporary Diversion Channels, DCT-1A and DCT-1B, regrade channel areas to existing conditions, seed and mulch all surrounding disturbed area for stabilization.

19. Reseed all disturbed areas if vegetation is not established after 30 days.
20. Remove Sediment Trap 1 and Temporary Interceptor channels ICT-1A and ICT-1B; regrade area to conditions prior to construction. Seed and mulch all surrounding disturbed areas.
21. Remove the rock construction entrance as grading operations are complete.
22. Remove all filter fence following completion of the above steps and after the site has a uniform 70% perennial vegetative cover on unpaved areas.

102.5 (b)(6) Temporary control measures and facilities for use during earthmoving.

Control measures and facilities such as filter fabric fence, slope blanketing, temporary interceptor and diversion channels, and temporary seeding will be utilized to control erosion and sedimentation and prevent sediment from leaving the site. See details included in the plans and details.

102.5 (b) (7) Permanent control measures and facilities for long term protection; and use during earthmoving.

Permanent control measures include permanent seeding. Vegetative surface stabilization specifications have been included on the attached Erosion and Sedimentation Control Detail Sheet.

102.5 (b)(8) A maintenance program for the control facilities including disposal of materials removed from the control facilities or project area.

A Maintenance Schedule for the erosion and sedimentation control measures and facilities is included in the attached plans and details. The maintenance of all temporary and permanent erosion and sedimentation control facilities is the responsibility of the contractor(s).

Procedures which ensure that the proper measures for the recycling or disposal of materials associated with or from the project site will be undertaken in accordance with Department regulations.

All construction wastes including, but not limited to temporary BMPs, excess soil materials, concrete wash water, sanitary wastes, and any materials that could adversely impact water quality must be disposed of properly at an approved DEP waste site.

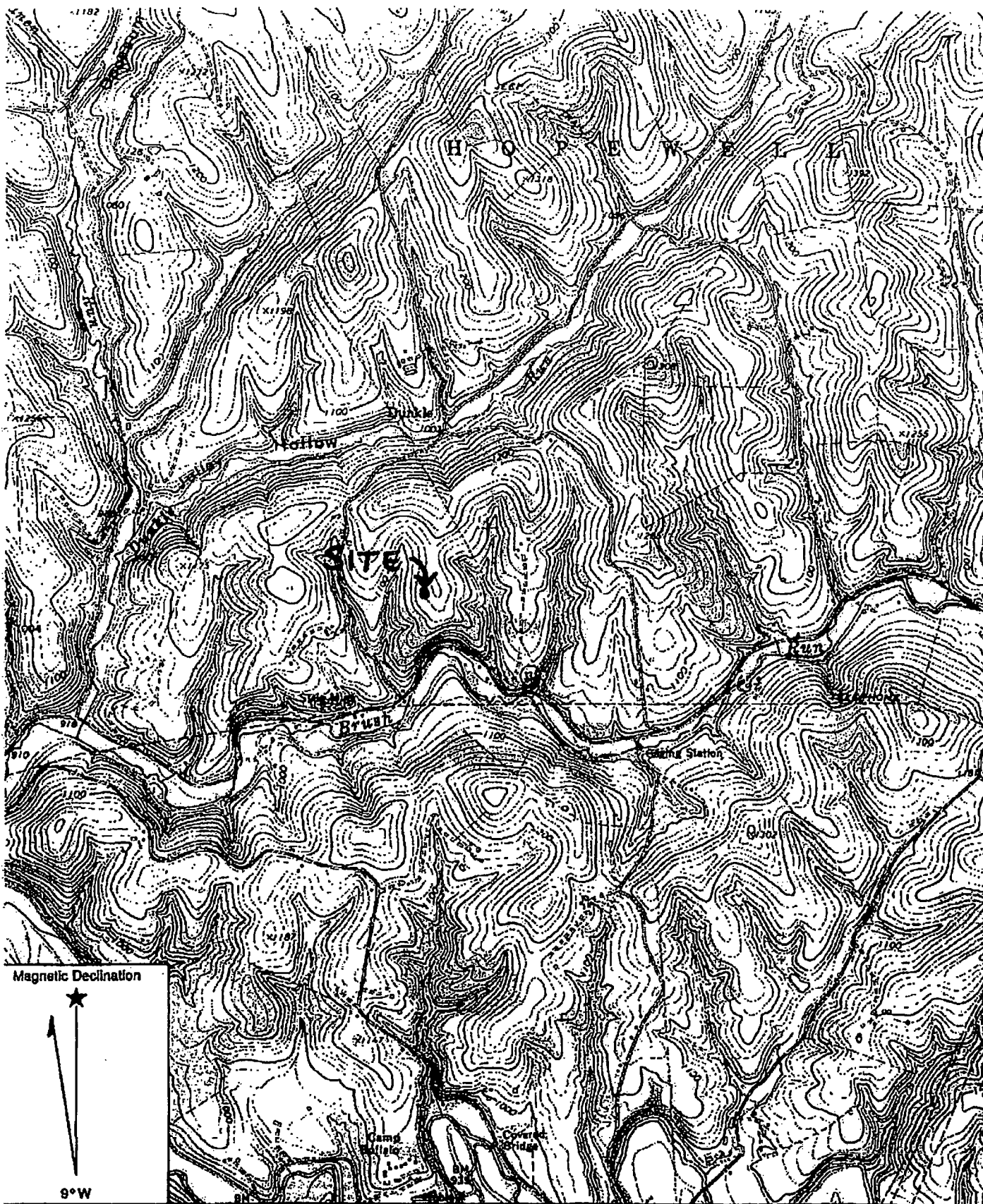
No offsite borrow or waste areas are anticipated due to balanced earthwork quantities on site.

Appendices

Table of Contents

Appendix A	U.S.G.S. Location Map, West Middletown quadrangle (1:24,000)
Appendix B	Washington County Soils Survey
Appendix C	Silt Fence Worksheets
Appendix D	Diversion and Interceptor Channel Calculations
Appendix E	Sediment Trap Calculations
Appendix F	Report Preparer Qualifications

Appendix A

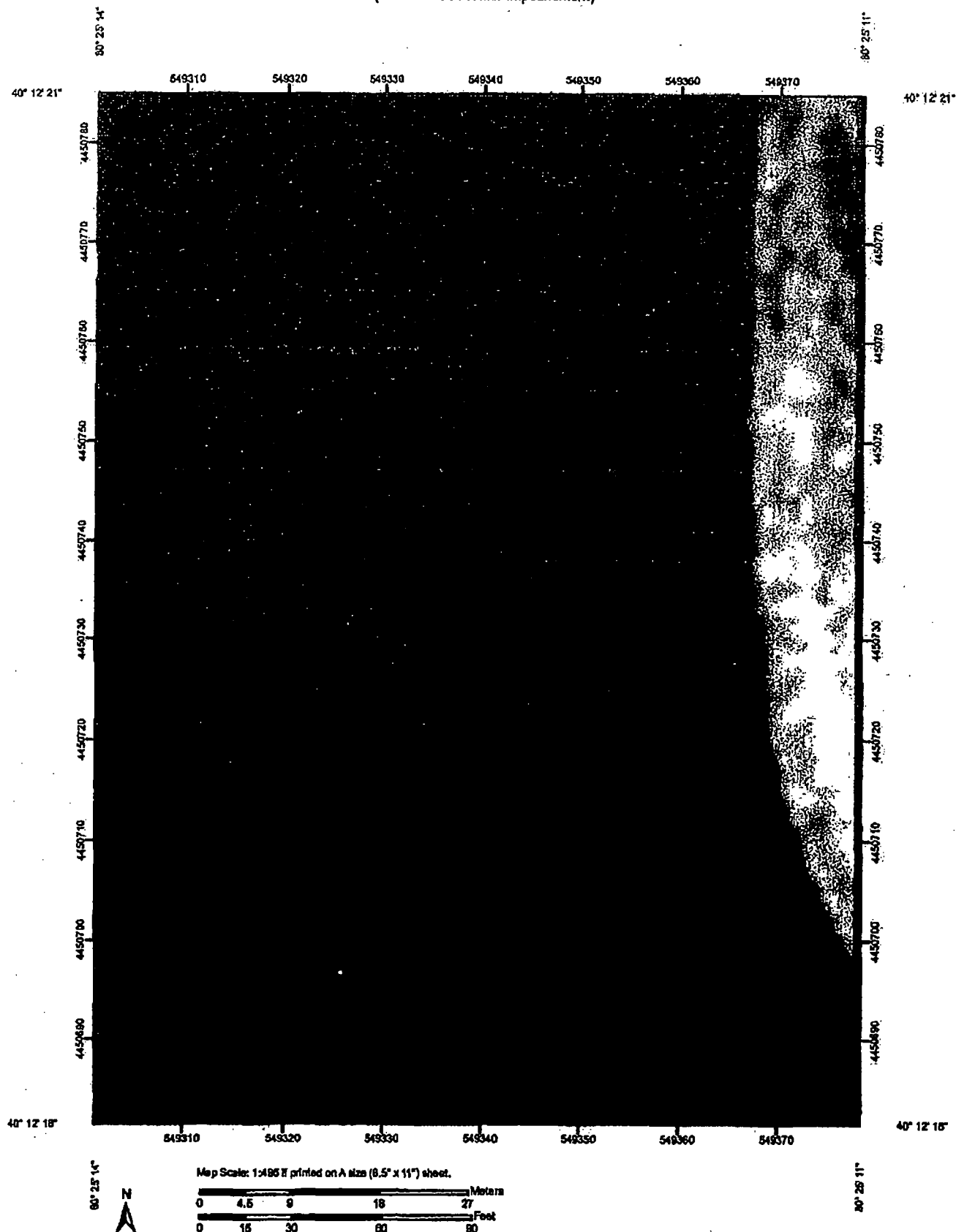


Name: WEST MIDDLETOWN
Date: 12/30/2008
Scale: 1 inch equals 2000 feet

Location: 040° 12' 18.83" N 080° 24' 57.69" W NAD 27
Caption: Kearns Fresh Water Impoundment Hopewell Township
Washington Co.

Appendix B

Soil Map—Greene and Washington Counties, Pennsylvania
(Keams Fresh Water Impoundment)



Soil Map—Greene and Washington Counties, Pennsylvania
(Kearns Fresh Water Impoundment)

MAP LEGEND






















Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Units

Special Point Features




-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot
-  Spoil Area
-  Stony Spot

 Very Stony Spot

 Wet Spot

 Other



Special Line Features

-  Gully
-  Short Steep Slope
-  Other






Political Features

 Cities

Water Features

-  Oceans
-  Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

MAP INFORMATION

Map Scale: 1:495 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Greene and Washington Counties, Pennsylvania

Survey Area Data: Version 5, Dec 3, 2008

Date(s) aerial images were photographed: 4/18/1994

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Greene and Washington Counties, Pennsylvania (PA611)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GeC	Guemsey silt loam, 8 to 15 percent slopes	0.4	33.6%
GeD	Guemsey silt loam, 15 to 25 percent slopes	0.7	66.4%
Totals for Area of Interest		1.1	100.0%

Embankments, Dikes, and Levees

Embankments, Dikes, and Levees—Greene and Washington Counties, Pennsylvania						
Area of Interest	Material Name	Rating	Component Name (Percent)	Rating (Notes)	Area (AC)	Percent of AG
GeC	Guernsey silt loam, 8 to 15 percent slopes	Very limited	Guernsey (80%)	Depth to saturated zone (1.00)	0.4	33.6%
				Hard to pack (0.04)		
				Thin layer (0.01)		
GeD	Guernsey silt loam, 15 to 25 percent slopes	Very limited	Guernsey (75%)	Depth to saturated zone (1.00)	0.7	66.4%
				Hard to pack (0.04)		
				Thin layer (0.01)		
Totals for Area of Interest					1.1	100.0%

Summary of Rating		
Area	Area (AC)	Percent of AG
Very limited	1.1	100.0%
Totals for Area of Interest		100.0%

Description

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. The soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the suitability of the undisturbed soil for supporting the embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

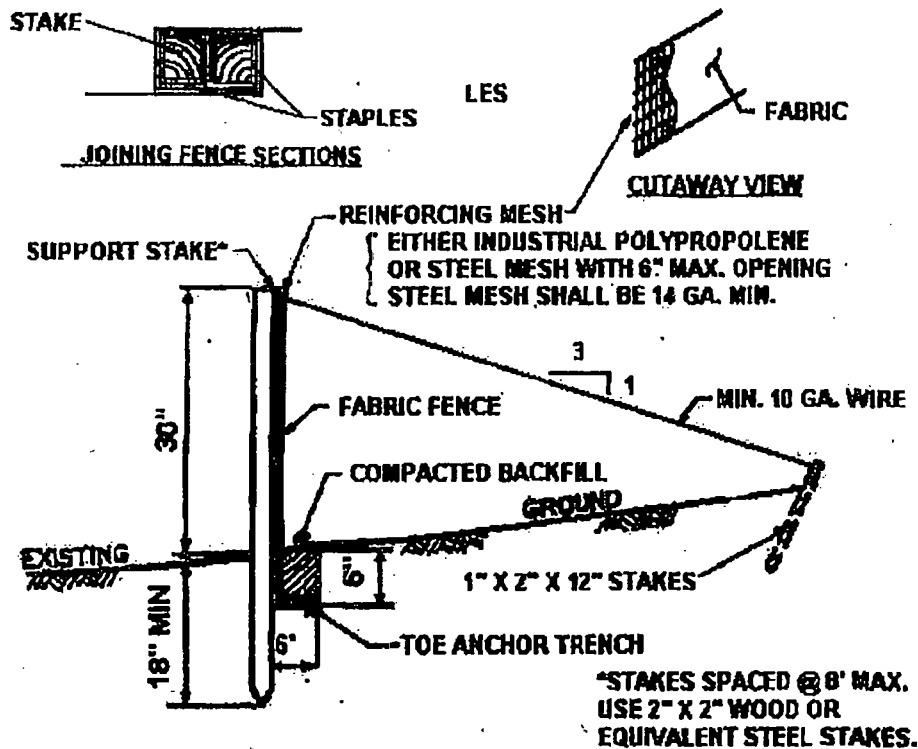
Tie-break Rule: Higher

Appendix C

STANDARD WORKSHEET # 3 Reinforced Filter Fabric Fence

PROJECT NAME: KERN'S FRESH WATER IMPOUNDMENT
 LOCATION: HOBNEWELL TWP. WASHINGTON CO C-17523-0002
 PREPARED BY: LNR DATE: 1/22/09
 CHECKED BY: _____ DATE: _____

CONSTRUCTION DETAIL:



Filter fabric fence must be installed at existing level grade. Both ends of each fence section must be extended at least 8 feet upslope at 45 degrees to the main fence alignment.

Sediment must be removed where accumulations reach 1/2 the above ground height of the fence.

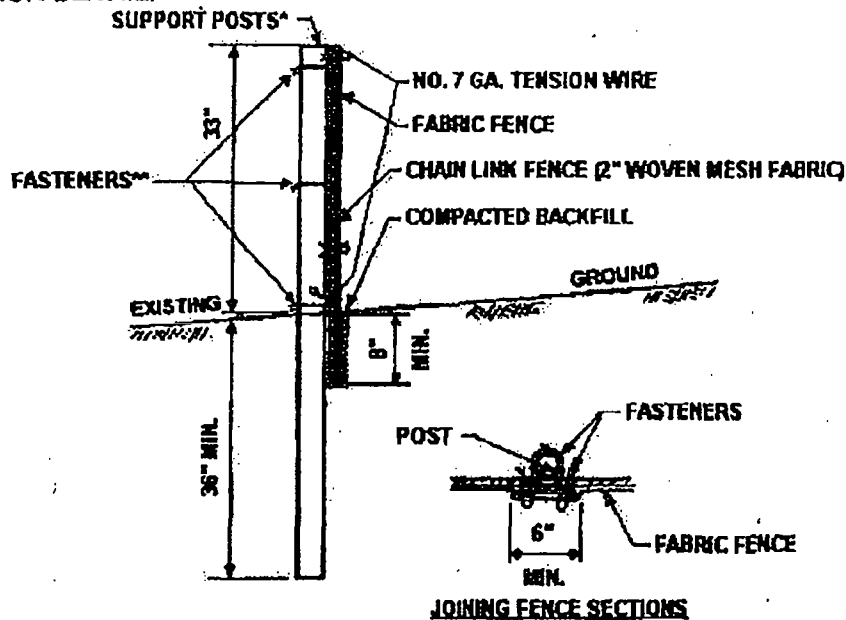
Any fence section which has been undermined or topped must be immediately replaced with a rock filter outlet. See Rock Filter Outlet Detail.

BARRIER NO.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
1	BELOW SEDIMENT POND	50	20'

STANDARD WORKSHEET #5 **Super Filter Fabric Fence**

PROJECT NAME: KERALS FRESH WATER IMPOUNDMENT
 LOCATION: HOPEWELL TWP. WASHINGTON CO. C-17523-8002
 PREPARED BY: LMR DATE: 1/22/09
 CHECKED BY: _____ DATE: _____

CONSTRUCTION DETAIL:



* Posts spaced @ 10' max. Use 2 1/2" dia. galvanized or aluminum posts.

** Chain Link To Post Fasteners spaced @ 14" max. Use No. 6 Ga. aluminum wire or No. 9 galvanized steel pre-formed clips. Chain Link To Tension Wire Fasteners spaced @ 60" max. Use No. 10 Ga. galvanized steel wire. Fabric To Chain Fasteners spaced @ 24" max. C to C.

Filter fabric fence must be installed at existing level grade. Both ends of each fence section must be extended at least 8 feet upslope at 45 degrees to the main fence alignment.

Sediment must be removed where accumulations reach 1/2 the above ground height of the fence.

Any fence section which has been undermined or topped must be immediately replaced with a rock filter outlet. See Rock Filter Outlet Detail.

BARRIER NO.	LOCATION	SLOPE-PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
1	SOUTH SIDE OF POND	33	118' w/ BLANKET
2	NORTH SIDE OF POND	33	116' w/ BLANKET

* BLANKET TO PROVIDE
ADDITIONAL PROTECTION

Appendix D



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DATE: 12/29/08
 PROJECT: Kearns Impoundment
 JOB NO: E-17523-0002
 BY: RSC
 CHECKED BY: _____

LABEL	AREA (Ac.)	i=5.7 (in/hr)	C _w	Q (cfs)	L (ft)	b _w (ft)	d (ft)	Slope (%)	LINING (NA GREEN)
DCT-1A	2.5	5.7	0.4	5.7	680	2	2	10.9%	C/25
DCT-1B	1.5	5.7	0.4	3.4	574	2	2	15.6%	C/25

Using Rational Equation to calculate

Peak Flow to Channel Assume Duration of 5 min.

Using PointDOT Region I IDF Curve for 25-yr Storm i=5.7 in/hr

$$Q = ciA$$

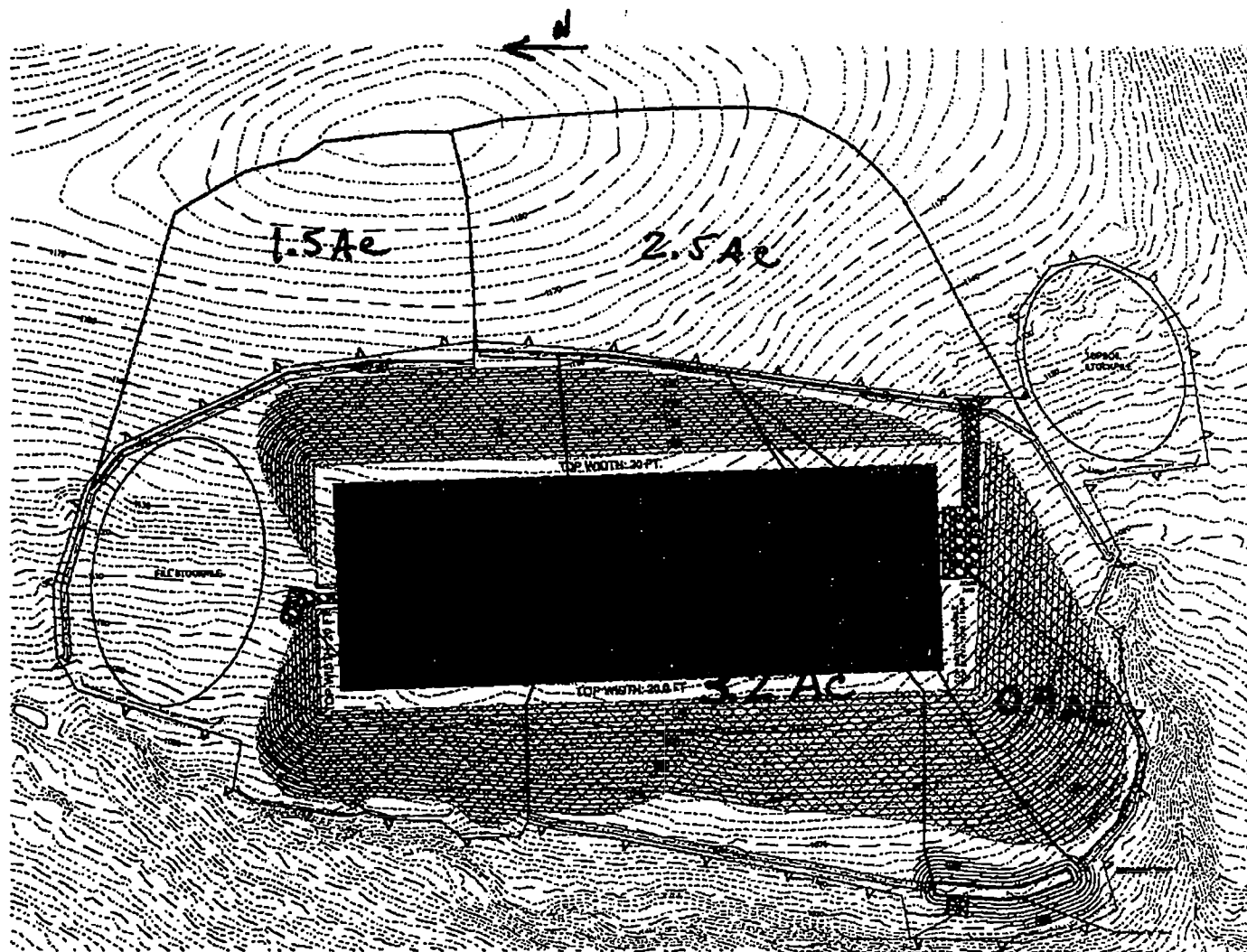
$$\text{DCT-1A } Q = (0.4)(5.7)(2.5) = 5.7 \text{ cfs}$$

$$\text{DCT-1B } Q = (0.4)(5.7)(1.5) = 3.4 \text{ cfs}$$

$$\text{ICT-1A } Q = (0.4)(5.7)(3.2) = 7.3 \text{ cfs}$$

$$\text{ICT-1B } Q = (0.4)(5.7)(0.9) = 2.0 \text{ cfs}$$

LABEL	AREA (Ac.)	i=5.7 (in/hr)	C _w	Q (cfs)	L (ft)	b _w (ft)	d (ft)	Slope (%)	LINING (NA GREEN)
ICT-1A	3.2	5.7	0.4	7.3	400	2	2	2.8	C/25
ICT-1B	0.9	5.7	0.4	2.0	185	2	2	8.0	C/25



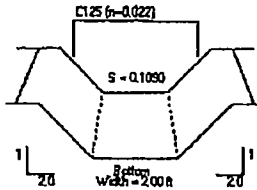
1" = 150'

North American Green - EDMS Version 4.3 11/22/2018 04:20 PM COMPUTED BY: LJR
 PROJECT NAME: LERNS POND PROJECT NO: C17523-0002
 FROM STATION/REACH: OCT-1A TO STATION/REACH: OCT-1A DRAINAGE AREA: 2.5 AC DESIGN FREQUENCY: 25 YR TEMP:
 HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq ft)	Hydraulic Radius (ft)	Normal Depth (ft)
5.7	0.1	6.09	0.71	0.22	0.28

$$0.28 + 0.5 = 0.78 < 2.0 \checkmark$$

$$0.28(12) = 3.36 > 2.0 \checkmark$$



LINEAR RESULTS

Not to Scale

Reach	Rating Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Stable Pattern		Phase	Class	Type	Density				
Straight	C12B	Unregulated					2.25	1.88	1.20	STABLE
	Stable D									

11/22/2018

NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: KERNS POND PROJECT NO.: C-17523-0002
COMPUTED BY: LMR DATE: 1/22/2009
FROM STATION/REACH: DCT-1A TO STATION/REACH: DCT-1A
DRAINAGE AREA: 2.5 AC DESIGN FREQUENCY: 25 YR TEMP

INPUT PARAMETERS

Channel Discharge : 5.7 cfs (.16 m³/s)
Peak Flow Period : 0.1 hours
Channel Slope : 0.109 ft/ft (0.109 m/m)
Channel Bottom Width : 2.0 ft (.61 m)
Left Side Slope : 2:1
Right Side Slope : 2:1

Channel Lining : C125 Staple D
Permi. Shear(Tp) : 2.25 psf (107.7 Pa)
Phase = 0

CALCULATIONS

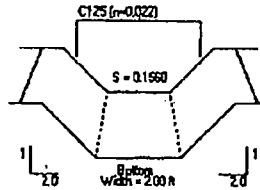
Initial Depth Estimate = $0.16 * (5.7 / (0.109^{0.5}))^{0.375} = 0.47 \text{ ft } (.14 \text{ m})$
Final Channel Depth (after 9 iterations) = .28 ft (0.08 m)
Flow Area = $(2.0 * 0.3) + (0.5 * 0.28^2 * (2.0 + 2.0)) = 0.7 \text{ sq.ft } (0.1 \text{ m}^2)$
Wet Per. = $2.0 + (0.3 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 3.2 \text{ ft } (1.0 \text{ m})$
Hydraulic Radius = $(0.7 / 3.2) = 0.2 \text{ ft } (0.1 \text{ m})$
Channel Velocity = $(1.486 / 0.022) * (0.2^{0.667}) * (0.109^{.5}) = 8.1 \text{ fps } (2.5 \text{ m/s})$

Channel Effective Manning's Roughness = 0.022
Calculated Shear (Td) = $62.4 * 0.28 * 0.109 = 1.88 \text{ psf } (90.0 \text{ Pa})$
Safety Factor = $(Tp/Td) = (2.25 / 1.88) = 1.20$

North American Green - ECOM5 Version 4.3
 PROJECT NAME: KERNS POND
 FROM STATION/REACH: OCT-18 TO STATION/REACH: OCT-18
 PROJECT NO: C-17523-0002
 DRAINAGE AREA: 1.5 AC
 DESIGN FREQUENCY: 25 YR TEMP

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq ft)	Hydraulic Radius (ft)	Normal Depth (ft)
3.4	0.1	7.72	0.44	0.16	0.19



$0.19 + 0.5 = 0.69 < 2.0 \checkmark$
 $0.69(12) = 2.28 > 2.0 \checkmark$

UNIFORM RESULTS

Not to Scale

Reach	Channel Type Stable Pattern	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
			Phase	Class	Type	Density				
Straight	C125	Unvegetated					2.25	1.81	1.24	STABLE
	Stable D									

17523-0002

NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: KERNS POND PROJECT NO.: C-17523-0002
COMPUTED BY: LMR DATE: 1/22/2009
FROM STATION/REACH: DCT-1B TO STATION/REACH: DCT-1B
DRAINAGE AREA: 1.5 AC DESIGN FREQUENCY: 25 YR TEMP

INPUT PARAMETERS

Channel Discharge : 3.4 cfs (.10 m³/s)
Peak Flow Period : 0.1 hours
Channel Slope : 0.156 ft/ft (0.156 m/m)
Channel Bottom Width : 2.0 ft (.61 m)
Left Side Slope : 2:1
Right Side Slope : 2:1

Channel Lining : C125 Staple D
Permi. Shear(Tp) : 2.25 psf (107.7 Pa)
Phase = 0

CALCULATIONS

Initial Depth Estimate = $0.16 * (3.4 / (0.156^{0.5}))^{0.375} = 0.36 \text{ ft } (.11 \text{ m})$
Final Channel Depth (after 10 iterations) = .19 ft (0.06 m)
Flow Area = $(2.0 * 0.2) + (0.5 * 0.19^2 * (2.0 + 2.0)) = 0.4 \text{ sq.ft } (0.0 \text{ m}^2)$
Wet Per. = $2.0 + (0.2 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 2.8 \text{ ft } (0.9 \text{ m})$
Hydraulic Radius = $(0.4 / 2.8) = 0.2 \text{ ft } (0.0 \text{ m})$
Channel Velocity = $(1.486 / 0.022) * (0.2^{0.667}) * (0.156^{.5}) = 7.7 \text{ fps } (2.4 \text{ m/s})$

Channel Effective Manning's Roughness = 0.022
Calculated Shear (Td) = $62.4 * 0.19 * 0.156 = 1.81 \text{ psf } (86.6 \text{ Pa})$
Safety Factor = $(Tp/Td) = (2.25 / 1.81) = 1.24$

 NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
 NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
 USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: KERNS POND PROJECT NO.: C-17523-0002
 COMPUTED BY: LMR DATE: 1/22/2009
 FROM STATION/REACH: ICT-1A TO STATION/REACH: ICT-1A
 DRAINAGE AREA: 3.2 AC DESIGN FREQUENCY: 25 YR TEMP

 INPUT PARAMETERS

Channel Discharge : 7.3 cfs (.21 m³/s)
 Peak Flow Period : 0.1 hours
 Channel Slope : 0.028 ft/ft (0.028 m/m)
 Channel Bottom Width : 2.0 ft (.61 m)
 Left Side Slope : 2:1
 Right Side Slope : 2:1

Channel Lining : C125 Staple D
 Permi. Shear(Tp) : 2.25 psf (107.7 Pa)
 Phase = 0

 CALCULATIONS

Initial Depth Estimate = $0.16 * (7.3 / (0.028^{0.5}))^{0.375} = 0.66 \text{ ft } (.20 \text{ m})$
 Final Channel Depth (after 9 iterations) = .46 ft (0.14 m)
 Flow Area = $(2.0 * 0.5) + (0.5 * 0.46^2 * (2.0 + 2.0)) = 1.3 \text{ sq.ft } (0.1 \text{ m}^2)$
 Wet Per. = $2.0 + (0.5 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 4.1 \text{ ft } (1.2 \text{ m})$
 Hydraulic Radius = $(1.3 / 4.1) = 0.3 \text{ ft } (0.1 \text{ m})$
 Channel Velocity = $(1.486 / 0.022) * (0.3^{0.667}) * (0.028^{.5}) = 5.4 \text{ fps } (1.7 \text{ m/s})$

Channel Effective Manning's Roughness = 0.022
 Calculated Shear (Td) = $62.4 * 0.46 * 0.028 = 0.81 \text{ psf } (38.6 \text{ Pa})$
 Safety Factor = $(Tp / Td) = (2.25 / 0.81) = 2.79$

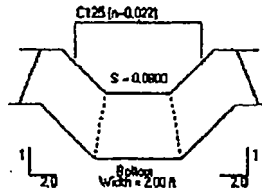
North American Green - ECHMS Version 4.3
 PROJECT NAME: KERNS POND
 FROM STATION/REACH: CT-18 TO STATION/REACH: CT-19
 PROJECT NO.: C-17523-0002
 DRAINAGE AREA: 0.9 AC
 DESIGN FREQUENCY: 25 YR TEMP

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hr)	Velocity (fps)	Area (sq ft)	Hydraulic Radius (ft)	Normal Depth (ft)
2.0	0.1	5.18	0.39	0.14	0.17

$$0.17 + 0.5 = 0.67 < 2.0 \checkmark$$

$$0.17(12) = 2.04 > 2.0 \checkmark$$



UNIFORM RESULTS

Not to Scale

Reach	Channel Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Stability Factor	Remarks
	Stable Pattern		Phenon	Class	Type	Density				
Straight	C125	Unvegetated					2.25	0.83	2.72	STABLE
	Stable 0									

0.000000

 NORTH AMERICAN GREEN EROSION CONTROL MATERIALS DESIGN SOFTWARE VERSION 4.3
 NORTH AMERICAN GREEN CHANNEL PROTECTION - ENGLISH/S.I.
 USER SPECIFIED CHANNEL LINING BACK-UP COMPUTATIONS

PROJECT NAME: KERNS POND PROJECT NO.: C-17523-0002
 COMPUTED BY: LMR DATE: 1/22/2009
 FROM STATION/REACH: ICT-1B TO STATION/REACH: ICT-1B
 DRAINAGE AREA: 0.9 AC DESIGN FREQUENCY: 25 YR TEMP

 INPUT PARAMETERS

Channel Discharge : 2.0 cfs (.06 m³/s)
 Peak Flow Period : 0.1 hours
 Channel Slope : 0.08 ft/ft (0.08 m/m)
 Channel Bottom Width : 2.0 ft (.61 m)
 Left Side Slope : 2:1
 Right Side Slope : 2:1

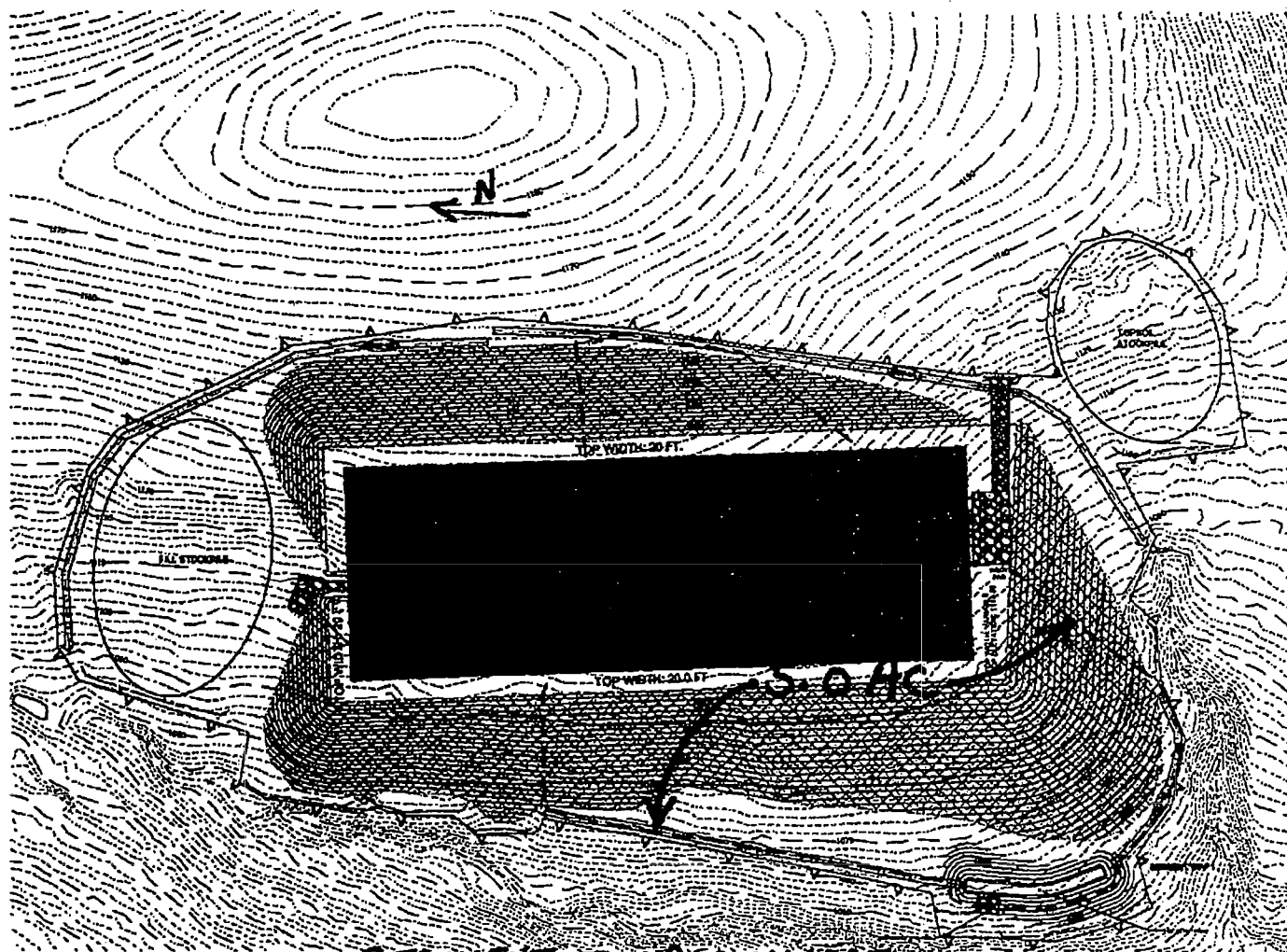
Channel Lining : C125 Staple D
 Permi. Shear(Tp) : 2.25 psf (107.7 Pa)
 Phase = 0

 CALCULATIONS

Initial Depth Estimate = $0.16 * (2.0 / (0.080^{0.5}))^{0.375} = 0.33 \text{ ft } (.10 \text{ m})$
 Final Channel Depth (after 10 iterations) = .17 ft (0.05 m)
 Flow Area = $(2.0 * 0.2) + (0.5 * 0.17^2 * (2.0 + 2.0)) = 0.4 \text{ sq.ft } (0.0 \text{ m}^2)$
 Wet Per. = $2.0 + (0.2 * (((2.0^2) + 1)^{.5} + ((2.0^2) + 1)^{.5})) = 2.7 \text{ ft } (0.8 \text{ m})$
 Hydraulic Radius = $(0.4 / 2.7) = 0.1 \text{ ft } (0.0 \text{ m})$
 Channel Velocity = $(1.486 / 0.022) * (0.1^{0.667}) * (0.080^{.5}) = 5.2 \text{ fps } (1.6 \text{ m/s})$

Channel Effective Manning's Roughness = 0.022
 Calculated Shear (Td) = $62.4 * 0.17 * 0.080 = 0.83 \text{ psf } (39.6 \text{ Pa})$
 Safety Factor = $(Tp / Td) = (2.25 / 0.83) = 2.72$

Appendix E



SEDIMENT TRAP DRAINAGE MAP

1" = 150'

STANDARD WORKSHEET #9 **Embankment Type Traps**

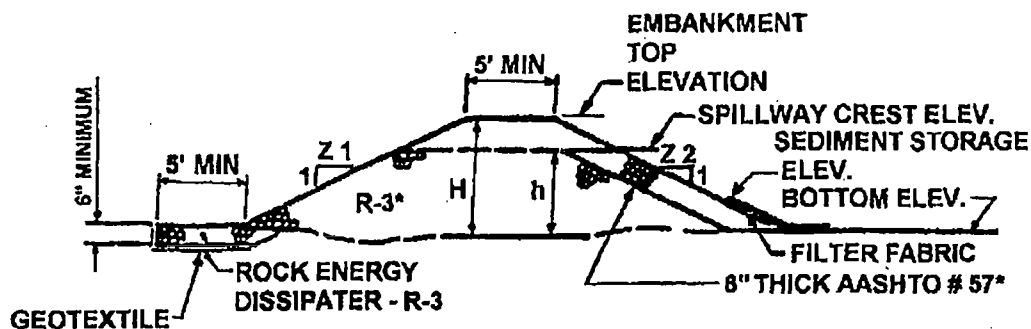
PROJECT NAME: KERNS FRESH WATER IMPOUNDMENT C-17523-0002
 LOCATION: HOPEWELL TWP. WASHINGTON CO.
 PREPARED BY: LUR DATE: 1/22/09
 CHECKED BY: _____ DATE: _____

CONSTRUCTION DETAIL:

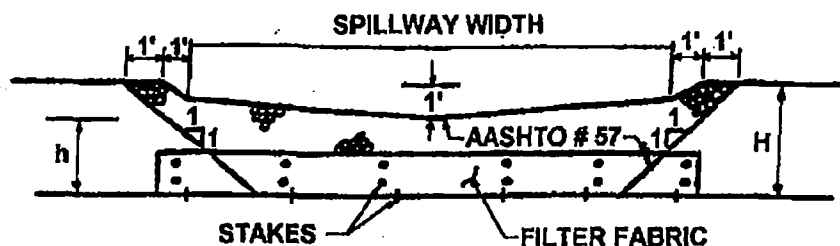
SEDIMENT TRAP NO. 1
 REQUIRED DIMENSIONS _____ X

Z1 = 2 Z2 = 2

H = 5 h = 4



SECTION THROUGH SPILLWAY*



NOTE: THE OUTLET EMBANKMENT IS TO BE COMPOSED ENTIRELY OF ROCK. THE MAIN BODY SHOULD BE LARGER STONE (R-3 MIN) WITH AN UPSTREAM LAYER OF SMALLER STONE (AASHTO #57 MAX).

NOTE: SHOW ALL DETAILS AND CONSTRUCTION DIMENSIONS ON PLAN DRAWINGS.

Minimum outlet top width (in feet) is 2 X the number of acres of contributing drainage area or 2 X h, whichever is greater. Maximum outlet side slope is 2:1.

Maximum embankment height is 5 feet. Outlet crest must be set at least 1 foot below top of embankment.

Outlet to stable erosion resistant areas.

Increase outlet top width to 6 X the number of acres of contributing drainage area when traps do not outlet into channels.

Minimum water depth of trap is 2 feet.

STANDARD WORKSHEET #8
Sediment Trap Data

PROJECT NAME: KERNS TRAIL ROAD
 LOCATION: HOPEWELL TWP. WASHINGTON CO.
 PREPARED BY: DEC DATE: 1/21/09
 CHECKED BY: _____ DATE: _____

TRAP NUMBER	#1				
DRAINAGE AREA (5 ACRES MAX) AC	5.0				
REQUIRED CAPACITY (2000 CF/AC) CF	10,000				
* AVERAGE BOTTOM LENGTH (FT)	130				
* AVERAGE BOTTOM WIDTH (FT)	10				
BOTTOM ELEVATION (FT)	1051.0				
TOP OF EMBANKMENT ELEVATION	1056.0				
CREST OF SPILLWAY ELEVATION	1055.0				
CLEAN-OUT ELEVATION (@ 700CF/AC)	1053.0 ~ 1052.8	700CF(5AC)	=	3500 CF	
FLOW LENGTH/WIDTH RATIO (2:1 MIN)	3:1				

EMBANKMENT SPILLWAYS

OUTLET WIDTH (FT) (GREATER OF 2 x # AC OR 2 x h)	10				
OUTLET SIDE SLOPES (2:1 MIN.)	2:1				

RISER PIPE SPILLWAYS

Dr (RISER DIAMETER, 8" MIN.)					
Db (BARREL DIAMETER, 6" MIN.)	N/A				
BARREL OUTLET ELEVATION (FT)					
MAX WATER SURFACE ELEVATION (@ 1.5 CFS/AC. DISCHARGE)					

OUTLET BASIN

LENGTH (6 Db)	Ft.	N/A			
WIDTH (3 Db)	Ft.	N/A			
RIPRAP PROTECTION (Size)					

* For Irregular shaped traps, provide stage storage data.

NOTE: Add data from this worksheet to worksheet #9 or #10 and show information on plan drawings.

Type.... Vol: Elev-Area
Name.... SED BASIN 1

Page 1.01

File.... G:\Projects\17000\17523 Mitchell Frac Pit\0002 Kerns\Doc's\Engineering\E & S\Tra

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (cu.ft)	Volume Sum (cu.ft)
1051.00	-----	1252	0	0	0
1052.00	-----	1825	4589	1530	1530
1054.00	-----	3046	7229	4819	6349
1056.00	-----	4368	11062	7374	13723

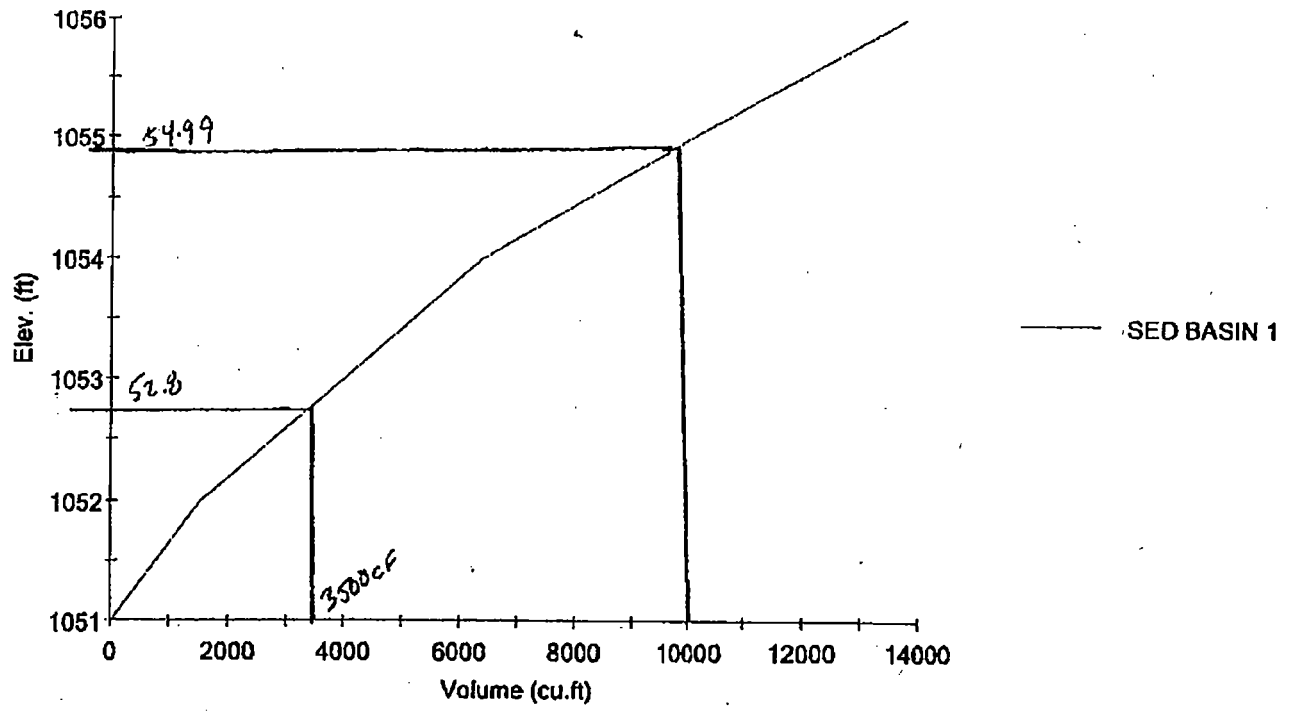
POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Areal} + \text{Area2} + \text{sq.rt.}(\text{Areal}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment
 Areal,Area2 = Areas computed for EL1, EL2, respectively
 Volume = Incremental volume between EL1 and EL2

Elev. vs. Volume
SED BASIN 1



Appendix F

EROSION AND SEDIMENTATION CONTROL PLAN
STANDARD WORKSHEET #2
RECORD OF TRAINING AND EXPERIENCE
IN EROSION AND SEDIMENTATION CONTROL METHODS AND TECHNIQUES

NAME OF PLAN PREPARER: Laura M. Rusmisl, E.I.T.

FORMAL EDUCATION:

Pennsylvania State University
BS - Civil Engineering

EMPLOYMENT HISTORY:

Current Employer: The Gateway Engineers, Inc. 400 Holiday Dr. Suite 300 Pgh, PA 15220
Telephone: 412-921-4030

Former Employer: Vegeler-Ramsey & Co., Inc.
Telephone:

RECENT EROSION AND SEDIMENTATION CONTROL PLANS PREPARED:

Name of Project: Parkwest Corporate Center
County: Allegheny
Municipality: Findlay Township
Permit Number: PA-R10-A431
Approving Agency: ACCD

Name of Project: South Fayette High School
County: Allegheny
Municipality: South Fayette Township
Permit Number: PA-R10-A423
Approving Agency: ACCD

Name of Project: Bethlen Home
County: Westmoreland
Municipality: Ligonier Township
Permit Number: PAR10X243
Approving Agency: WCD

Name of Project: Sturbridge Court
County: Allegheny
Municipality: Franklin Park Borough
Permit Number: PA-R10-A580
Approving Agency: ACCD

Name of Project: Longview Estates
County: Allegheny
Municipality: South Fayette Township
Permit Number: PA-R10-A592
Approving Agency: ACCD

Name of Project: Woodlands at Trout Run
County: Allegheny
Municipality: Moon Township
Permit Number: PA-R10-A561
Approving Agency: ACCD

Name of Project: Parkes Farm Phase I,II,III,IV,V
County: Allegheny
Municipality: South Fayette Township
Permit Number: PA-R10-A558
Approving Agency: ACCD

Name of Project: Imperial Ridge
County: Allegheny
Municipality: South Park Township
Permit Number: PA-R10-A548
Approving Agency: ACCD

Name of Project: Silver Oaks
County: Allegheny
Municipality: Robinson Township
Permit Number: PA-R10-A603
Approving Agency: ACCD

Name of Project: Foxwood Knolls
County: Allegheny
Municipality: Moon Township
Permit Number: PA-R10-A600
Approving Agency: ACCD

Name of Project: Wiltshire Estates
County: Allegheny
Municipality: Moon Township
Permit Number: PA-R10-A609
Approving Agency: ACCD

Name of Project: DR Ice Sports Complex
County: Westmoreland
Municipality: City of New Kensington
Permit Number: PA-R10-X311
Approving Agency: WCD

Name of Project: Peterswood Park
County: Washington
Municipality: Peters Township
Permit Number: PAG2-0063-03001
Approving Agency: WCCD

Name of Project: Village Shops at the Monroeville Mall
County: Allegheny
Municipality: Municipality of Monroeville
Permit Number: PA-R10-A620
Approving Agency: ACCD

Name of Project: Sweet Brier Plan of Lots
County: Beaver
Municipality: Hopewell Township
Permit Number: PAG2-0004-03-003
Approving Agency: BCCD

KERNS FRESHWATER IMPOUNDMENT


HOPEWELL TOWNSHIP
WASHINGTON COUNTY

PREPARED FOR:
RANGE RESOURCES APPALACHIA, LLC
380 SOUTHPOINTE BLVD. SUITE 300
CANONSBURG, PA 15317

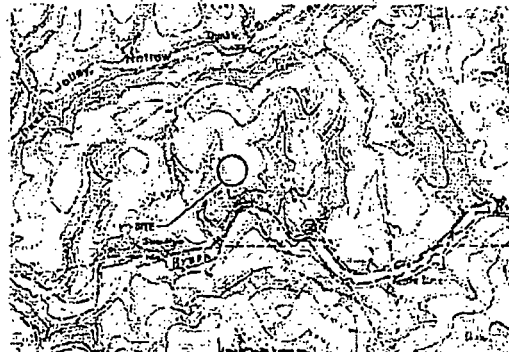
CALL BEFORE YOU DIG!

**FEDERAL WINDY LAW REQUIRES
A WORKING DAYS NOTICE FOR
CONSTRUCTION PHASE AND 18 WORKING
DAYS IN DESIGN PHASE - STOP CALL**

Presidents Call Call Service, Inc.

 **1-800-242-1778**

CONSULTANTS



SITE LOCATION MAP
U.S.A.

LIST OF UTILITIES

DWG No.	SHEET TITLE	INCLUDED
0000	COVER SHEET	M
C101	EROSION AND SEDIMENTATION CONTROL PLAN	Y
C102	EROSION AND SEDIMENTATION CONTROL DETAILS	Y
C103	EROSION AND SEDIMENTATION CONTROL DETAILS	Y
C104	EROSION AND SEDIMENTATION CONTROL DETAILS	M
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[illegible]

GATEWAY



KERNS FRESHWATER IMPOUNDMENT
KERN COUNTY
KERNVILLE, TEXAS
WASHINGTON COUNTY

RANGE RESOURCES APPALACHIA, LLC
P.O. BOX 100
SOUTH POINTE BLVD. SUITE 300
CHANDLER, AZ 85224

COVER
PAGE

C000

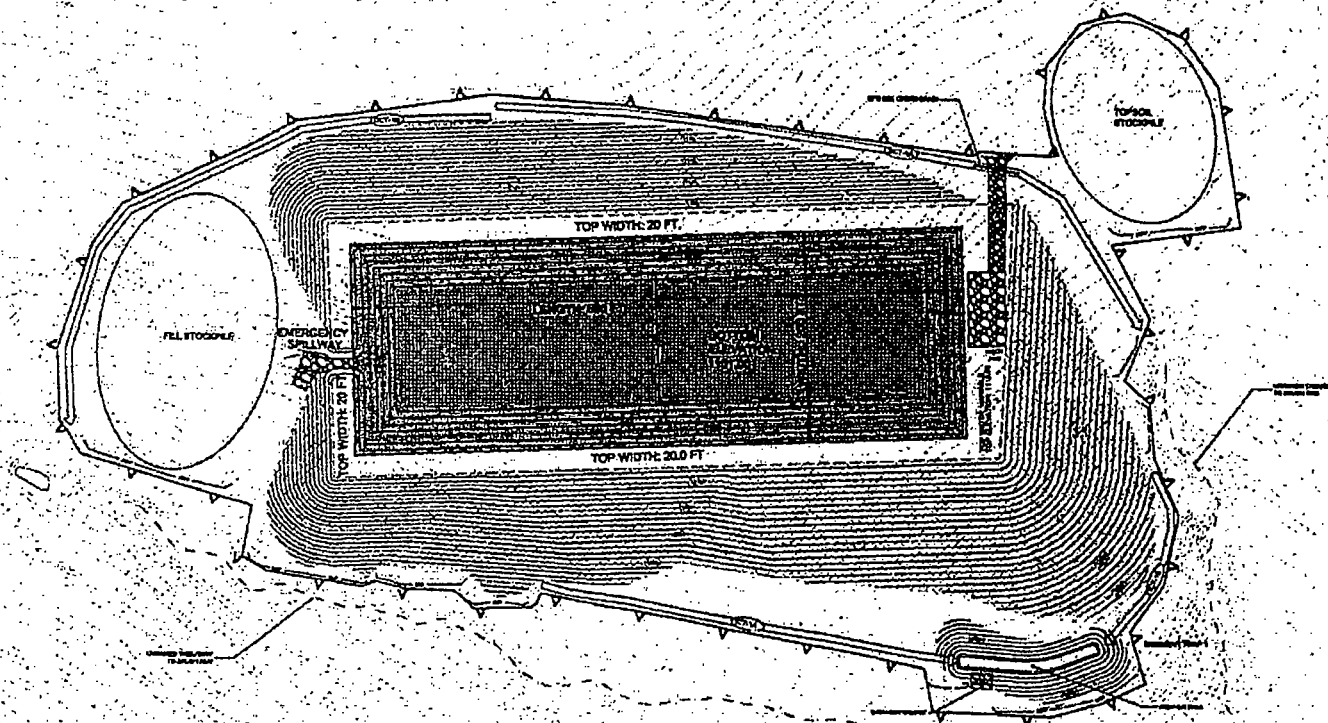
THIS PLAN IS FOR EROSION AND SEDIMENTATION CONTROL PURPOSES ONLY



**EROSION & SEDIMENTATION
CONTROL LEGEND**

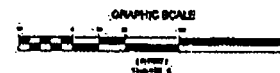
- 1' LIMIT OF DISTURBANCE PROJECT LIMIT
- STANDARD FILTER FABRIC FENCE (4' HIGH)
- REINFORCED FLEXIBLE PAVED ROAD PERMITS
- 2' HIGH SALT FENCE
- ROAD CONSTRUCTION ENTRANCE
- EROSION CONTROL MEASURES
STEEP SLOPE RELOADED
- IMPERMEABLE POND LINER

NOTES:
1. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EROSION CONTROL ACT OF 1970 AND THE EROSION CONTROL REGULATIONS OF THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL POLICE.



**SITE LOCATION MAP
WEST MIDDLETOWN QUAD
NTS**

**TOTAL AREA = 9.8± ACRES
DISTURBED AREA = 9.8± ACRES**



CALL BEFORE YOU DIG!
Federal, State, and Local Agencies
and Utility Companies Must Be Notified
Before Any Digging or Drilling Operations
Begin in ORDER TO AVOID DAMAGE TO
UNDERGROUND UTILITIES.
Call 1-800-342-1778
FOR MORE INFORMATION

**KERNS FRESHWATER IMPOUNDMENT
RANGE RESOURCES APPALACHIA, LLC**
1500 SOUTH MAIN ST., SUITE 200
CHARLOTTE, NC 28203

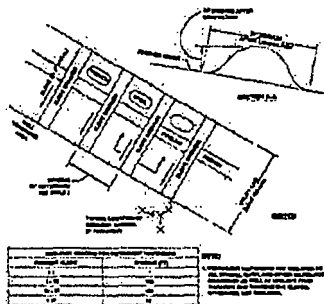
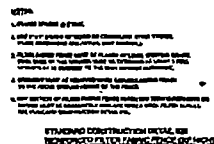
**EROSION AND
SEDIMENTATION
CONTROL PLAN**
Project Name: Kerns Freshwater Impoundment
Project Location: Range Resources Appalachia, LLC
Project No.: 1500-SM-200-01
Date: 10/1/2015

C131

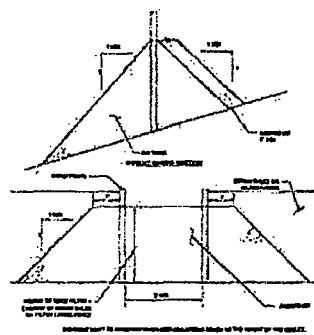
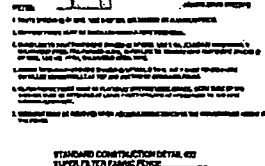
GATEWAY
SPECIALTY
CONSTRUCTION & SERVICE
1500 SOUTH MAIN ST., SUITE 200
CHARLOTTE, NC 28203
704.375.1111
www.gatewaync.com



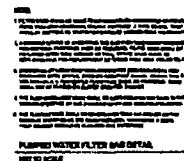
DATE	REVISION	DESCRIPTION
10/1/2015	1	ISSUED FOR PERMIT



PEOPLE FOR POLITICAL FREEDOM



STANDARD CONSTRUCTION DETAIL W/3
ROCK FILTER OUTLET



Board Tests (in Class) for Significance



Year	Number of cases
1970	100
1971	120
1972	140
1973	160
1974	180
1975	200
Total	1000

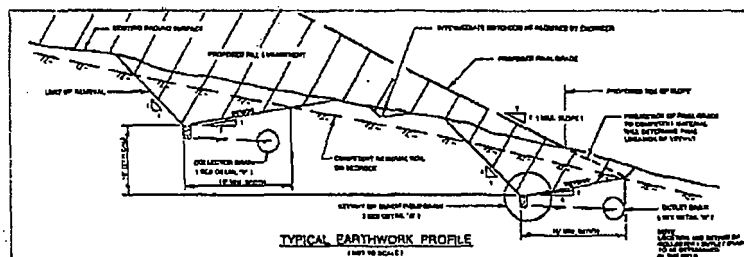
This copy for distribution will follow GPO #8 above in item 17 of my one transmittal to Port SEC Z
same as last go - please excuse late delivery on shipment.

Conclusion: The results of this study suggest that the use of a single, standardized, and validated questionnaire is a feasible and reliable method for assessing the prevalence of mental health problems in a community sample.

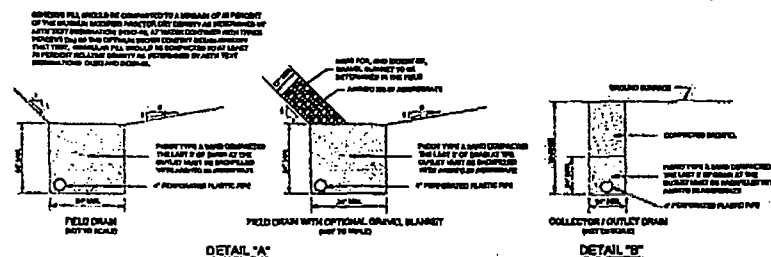
The entry South Sister Organizational is correct as was (f) general status of organization per 1-6-1962-100 which the subject is agreement with his approval 1-6-1962 PMS and PMS South and Federal Publics South Organizational status 1-6-1962 as 1-6-1962 as per

[illegible]

9. Use of lethal substances for public control to address environmental threats to plant and animal species or to environmental or cultural heritage sites
10. Use of lethal substances for pest control in agriculture, horticulture, aquaculture, and silviculture
11. Use of lethal substances for control of invasive alien species and other pest organisms, including insects, birds, and mammals
12. Use of lethal substances for control of pest organisms in agriculture, horticulture, aquaculture, and silviculture
13. Use of lethal substances for control of pest organisms in agriculture, horticulture, aquaculture, and silviculture
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30. Use of lethal substances for control of pest organisms in agriculture, horticulture, aquaculture, and silviculture



TYPICAL EARTHWORK PROFILE

**DETAIL 'A'**

DETAIL "B"



DATE	NO.	REMARKS	RECEIVED BY
6-14-59	1	RECEIVED BY	
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KERNS FRESHWATER IMPOUNDMENT
HOPEWELL TOWNSHIP
WASHINGTON COUNTY

RANGE RESOURCES APPALACHIA, LLC
PREPARED FOR
340 SOUTHPOINTE BLVD., SUITE 300
CAMDEN, PA. 17017

**EROSION AND
SEDIMENTATION
CONTROL DETAILS**
Project Number: C-132-0001
Working Order: PLS
Date Issued: 10/11/77
Notes: 1. 10/11/77
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TEMPORARY EROSION INFORMATION:

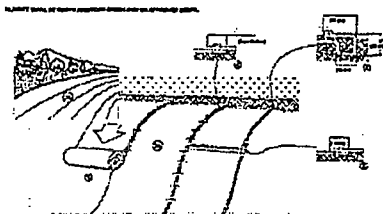
- SECTION 101** - This section contains information regarding the temporary erosion control measures that are required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.
- SECTION 102** - This section contains information regarding the temporary erosion control measures that are required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.
- SECTION 103** - This section contains information regarding the temporary erosion control measures that are required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.

PERMANENT EROSION INFORMATION:

- SECTION 104** - This section contains information regarding the permanent erosion control measures that are required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.
- SECTION 105** - This section contains information regarding the permanent erosion control measures that are required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.
- SECTION 106** - This section contains information regarding the permanent erosion control measures that are required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.

FINAL EROSION INFORMATION:

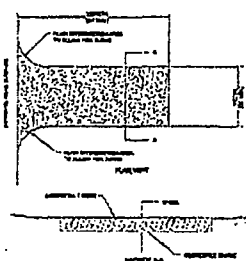
- SECTION 107** - This section contains information regarding the final erosion control measures that are required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.
- SECTION 108** - This section contains information regarding the final erosion control measures that are required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.
- SECTION 109** - This section contains information regarding the final erosion control measures that are required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.



1. The topsoil layer should be at least 2 inches thick and should be applied to the slope before the seed layer is applied.
2. The seed layer should be at least 1/4 inch thick and should be applied to the slope after the topsoil layer is applied.
3. The mulch layer should be at least 2 inches thick and should be applied to the slope after the seed layer is applied.

NOTE: The topsoil layer should be at least 2 inches thick and should be applied to the slope before the seed layer is applied.

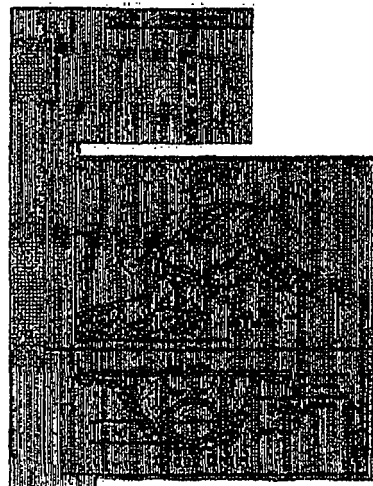
SLOPE BLANKET INSTALLATION DETAIL



1. The topsoil layer should be at least 2 inches thick and should be applied to the slope before the seed layer is applied.
2. The seed layer should be at least 1/4 inch thick and should be applied to the slope after the topsoil layer is applied.
3. The mulch layer should be at least 2 inches thick and should be applied to the slope after the seed layer is applied.

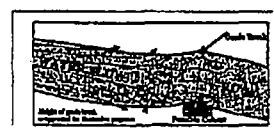
STANDARD CONSTRUCTION DETAIL

SECTION 110 - This section contains information regarding the standard construction detail that is required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.



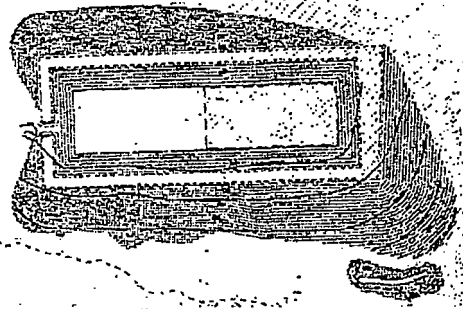
STANDARD CONSTRUCTION DETAIL

SECTION 111 - This section contains information regarding the standard construction detail that is required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.



STANDARD CONSTRUCTION DETAIL

SECTION 112 - This section contains information regarding the standard construction detail that is required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.



STANDARD CONSTRUCTION DETAIL

SECTION 113 - This section contains information regarding the standard construction detail that is required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.

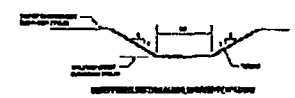
ON-LOT SEDIMENT CONTROL PLAN

MAINTENANCE SCHEDULE

ITEM	DATE	DESCRIPTION	REMARKS
1. Sediment traps	1/1/20	Inspected and cleaned	Good
2. Silt fences	1/1/20	Inspected and cleaned	Good
3. Stormwater management system	1/1/20	Inspected and cleaned	Good
4. Erosion control measures	1/1/20	Inspected and cleaned	Good
5. Final erosion control measures	1/1/20	Inspected and cleaned	Good

ALL REPAIRS TO BE COMPLETED WITHIN 72 HOURS OF DISCOVERY

The contractor shall be responsible for maintaining the erosion control measures in good condition. If any damage or failure is discovered, the contractor shall repair or replace the measures within 72 hours of discovery. The contractor shall also be responsible for maintaining the sediment traps and silt fences in good condition. If any damage or failure is discovered, the contractor shall repair or replace the measures within 72 hours of discovery.



STANDARD CONSTRUCTION DETAIL

SECTION 114 - This section contains information regarding the standard construction detail that is required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.

STANDARD CONSTRUCTION DETAIL

SECTION 115 - This section contains information regarding the standard construction detail that is required to be installed on all construction sites. The information is intended to be used by the contractor to ensure that the erosion control measures are installed and maintained in accordance with the requirements of the permit.

GATEWAY

CONSTRUCTION & DEVELOPMENT

10000 S. HIGHWAY 100, SUITE 100, WEST VALLEY, UT 84086

TEL: (801) 373-1000 FAX: (801) 373-1001

KERNS FRESHWATER IMPOUNDMENT

APACHE COUNTY, ARIZONA

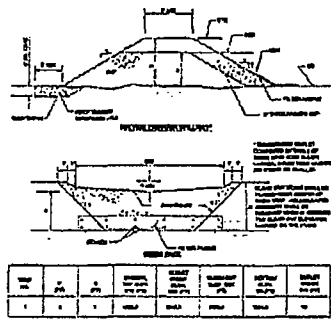
RANGE RESOURCES APPALACHIA, LLC

2000 S. HIGHWAY 100, SUITE 100, WEST VALLEY, UT 84086

TEL: (801) 373-1000 FAX: (801) 373-1001

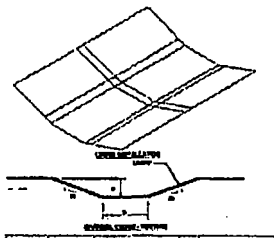
CONSTRUCTION AND MAINTENANCE CONTROL DETAILS

C133



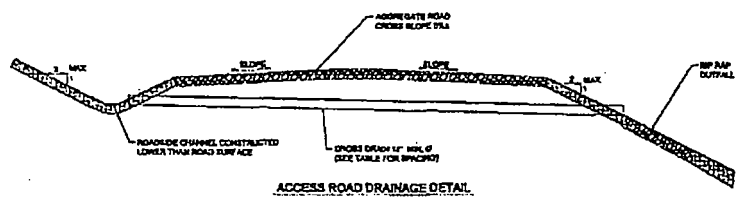
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STANDARD DETAIL #11
DRAINAGE DITCH

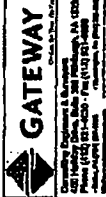


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STANDARD DETAIL #11
DRAINAGE DITCH



ACCESS ROAD DRAINAGE DETAIL



NO.	DATE	BY	CHKD.	APP'D.	REVISION
1	10/1/10	JL			ISSUED FOR CONSTRUCTION

KERNS FRESHWATER IMPOUNDMENT
HARRIS COUNTY
RANGE RESOURCES APPALACHIA, LLC
BIRMINGHAM, AL 35202

CONSTRUCTION
RECOMMENDATION
CONTROL DETAILS
C134

PREPAREDNESS PREVENTION AND CONTINGENCY PLAN (PPC) WASHINGTON COUNTY

Range Resources Appalachia, LLC
380 Southpointe Blvd., Suite 300
Canonsburg, PA 15317

January, 2009

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1.0 EXECUTIVE SUMMARY

This Preparedness Prevention and Contingency (PPC) Plan is prepared for Range Resource Corporation's operations in Washington County, Pennsylvania. The sites are identified in the permit application which will be located in Washington County. This PPC Plan was developed in accordance with PA DEP Guidelines #400-2200-001/September 2001, *Guidelines for the Development and Implementation of Environmental Emergency Response Plans*.

This PPC Plan is an integral part of the operation's environmental, health and safety program. It is designed to provide for foreseeable workplace occurrences and provide the response framework for those occurrences, which have the potential for employee injury or environmental damage. It contains program elements designed for prevention/control of accidental discharges of regulated substances. Further, the plan is designed to be flexible, with established guidelines, and will be reviewed on a regular basis to assure the plan is a current, viable, and useful tool.

Mr. Ralph Tijerina is the administrator of this PPC Plan and is responsible for implementation and maintenance. Reviews and revisions of this plan will be completed annually unless plan failure, operational changes, or regulatory revisions necessitate otherwise. Any questions, comments, or suggestions regarding this PPC Plan should be directed to Mr. Ralph Tijerina

Authorized for Implementation:

Ralph Tijerina

Environmental Health and Safety Manager

Date Implemented

2.0 PLAN REVIEW RECORD

The following table is a record of the periodic revisions made to this plan since the original date of plan implementation. It is required by the PADEP that the plan be reviewed annually. This plan will also be reviewed and revised if any of the following occur:

- An applicable regulation is revised;
- The plan fails in an emergency;
- There is a change in the design, construction, operation, or maintenance that materially affects the operation's potential for discharge;
- The list of emergency coordinators changes;
- The list of emergency response equipment changes; or
- As otherwise directed by an applicable agency.

Date	Revision	Signature	Comments
1-1-2009	1A		Update

3.0 DESCRIPTION OF SITES

3.1 Description of the Industrial or Commercial Activity

Activity to be conducted at these sites will include but not be limited to the construction of road to the well-site and the pad on which the drilling operation will be conducted, drilling of the borehole following the casing design and strategic analysis described in the Drilling Permit Application, Completing and Fracing of the well, Flowback operations and Production. The operation will be at various locations as described in the permit application within Washington County. All coordinates for each borehole are stipulated in the Drilling Permit Application accompanied by this PPC plan.

- The average constituents of the NGL are propane (18.28%), butane (24.59%), iso-butane (7.32%), and pentane and longer chain hydrocarbons (49.81%).
- The operation's North American Industry Classification Systems (NAICS) code is 211111 (Crude Petroleum and Natural Gas Extraction).

3.2 Description of Existing Emergency Response Plans

This plan is compatible with existing emergency response and spill prevention plans. The operations and subcontractors maintain a Spill Prevention Control and Countermeasure (SPCC) Plan compliant with 40 Code of Federal Regulations Part 112.

3.2.1 Assessments of Impacts on Downstream Water Supplies or Water Wells in Area

As part of the plan to ensure that no impacts occur to either downstream water supplies or water wells, an assessment of all water sources within a 1000 ft radius of the well site will be conducted by identified and samples will be taken to establish a baseline prior to any activity.

The samples will be collected and tested by a state certified water-testing laboratory in order to assure an independent objective assessment. These test results will be maintained in the well file should reference be required in the future. During the testing process, RRC will ensure that adequate water supplies are provided to those utilizing the water well in question.

Best Management Practices (BMPs) will be in place to prevent the contamination of any water supply either downstream or an identified water well. Preliminary water sampling will be conducting in accordance to established requirements.

Well Control Guideline plans include the use of equipment to contain any large amounts of water which may be required to contain or control any fires should the need exist.

During the drilling and completion process, all returned fluids will be contained in a lined reserve pit or 500 bbl frac tanks to prevent any run-off that could cause contamination to existing water wells or streams.

3.3 Materials and Waste Inventory

3.3.1 Liquid Storage Description

- 5 gal pails
- 55 gal drums
- 500 gal intermediate bulk containers
- 20,000 gal max diesel storage

3.3.2 Dry Bulk Storage Description

- 50 lb sack chemicals
- 55 lb sack chemicals
- 100 lb sack chemicals
- 1 ton bulk bag

The following products are used for the operations described above but are subject to change based on the circumstances encountered during the development of the project. The MSDS for each product are required to be on site while any chemical is staged on location.

MC M-8650

MC MX 525-5

MCSS 5359

MC MX S-2510T

B-8650

S-2510T

K 34

HCL Acid Plus Inhibitor and Surfactant

BC 140

Delta Frac 140FE-1A Acidizing Composition

FR-46

HAI-OS Acid Inhibitor

Hydrochloric Acid 5-10%

X-TEND II

Sodium Chloride

Potassium Chloride

Ultrahib

Ultracap

Polypac UL/ELV

DUO-Vis/ XCD Polymer

Ultrafree

M-I Bar

Aldacide G Antimicrobial

Bara-Defoam 1

Barazan D Plus

Bariod

Bicarbonate of Soda

Bore-Hib
Bore-Plus
Bore-Vis
Bore-Vis II
Calcium Hypochlorite – Hydrated
Caustic Soda
Citric Acid
Clay Grabber
Clayseal Plus
Dextrid LT
Pac L
Polyac Plus
Diesel Oil
CI-14
Ferrotrol 300L
XLW-32
GW-3LDF
GBW-20C
BF-7L
GBW-15L
FRW-14
FRW-25
Alpha-125
Methanol
40 HTL

NE 100

FE 100L

HVG-04

HVG-01

B9

BXL-2

ICI-3240

ICI-150

FRW-50

FRW-25

Iron Check

Unilink

GBL-8X

Unigel 19XL

FRP-21

Bioclear 200

AI-2

IC-100L

OB-Fe

Super OW-3

Super Pen 2000

Super 100NE

Bioclear 200

SAS-2

3.3.3 Waste

Waste accumulated on site will be collected accordingly and disposed of in various manners dependent upon the classification. Waste will be minimized by the utilization of larger packaging containers. Where possible, intermediate bulk containers will be used as they can be reutilized instead of using drums thus resulting in minimal waste products.

Municipal Waste

Containerization via Waste Management

Produced/ Frac/ Pit Water

Produced water will be collected by use of vacuum trucks and disposed of accordingly to the proper sites. The following information contains the names of the various companies that will transport the produced water to sites identified in Section 6.6.

R.T.I.

Highland Environmental Sanitation

MJ Water Co, Inc

Woods Trucking

Ted Stutzman

Devonian Industries, Inc

Burkholtz Welding

Stallion Oilfield Services

Force

3.4 Pollution Incident History

There is no history pertaining to any pollution for these areas in which the drilling permit is being requested as these are not part of any current operations in which Range Resources is conducting business. Completed records of future occurrences with spill reporting and response will be included in Appendix C.

Should a spill occur, the following information will be recorded and maintained for five years:

1. Date and time of incident;
2. Location of incident;

3. Name of individual discovering the incident;
4. Product released and amount released;
5. Causes of the spill, including failure analysis;
6. Corrective actions and/or countermeasures taken and additional preventative measures taken or contemplated.

3.5 Implementation Schedule for Elements Not Currently In Place

As of the signature dates on page 1 of this plan, all elements of this plan are currently in place.

4.0 DESCRIPTION OF HOW PLAN IS IMPLEMENTED BY ORGANIZATION

4.1 Organizational Structure of Facility for Implementation (Pollution Prevention Team)

The operational headcount on site will be no more than 30 personnel at any given time which includes both Range Resources Corp and its subcontractors. The primary emergency coordinator's duties and responsibilities will be as follows:

1. Risk management and inventory of materials,
2. Establishment of all spill-reporting duties,
3. Implementation of visual inspection procedures,
4. Review of past incidents and actions taken,
5. Implementation of plan goals,
6. Coordinate all spill clean-up activities,
7. Notification of all necessary authorities,
8. Education and training of all on-site personnel,
9. Evaluation of plan and change as needed,
10. Review any changes relative to the current plan,
11. Evaluate overall effectiveness of plan, and
12. Review and update the plan on a regular basis and make changes as necessary.

Changes made to the plan affecting the personnel will be communicated at the earliest available time, generally during safety meetings and put into practice as part of standard operating procedures, where necessary. Where mentoring or extended training is required for the individuals to gain experience, a mentoring system will be put in place and On-The-Job training will be documented.

4.2 List of Emergency Coordinators

The following table shows a list of the Emergency Coordinators for Range Resources Appalachia, LLC, Washington County.

All calls to report an emergency or contact one of the Emergency Coordinators should to:

(866) 768-4756

Emergency Coordinators

Name	Title
Mr. Ralph Tijerina	Director - Health, Safety and Environmental
Mr. John Applegath	Vice President – Drilling
Mr. Matt Curry	Completions Manager
Mr. Steve Rupert	Vice President - Production

In the event the Primary Emergency Coordinator is not present at the time of an emergency, the designated alternate individuals will accept those responsibilities.

In the rare event none of the above personnel are present; the ranking supervisor on-site will be in charge of the facility until the appropriate personnel can be contacted. All supervisory personnel who may be in charge of the facility will be trained in the proper response procedures in the event of an emergency.

Emergency phone numbers along with site lat/long coordinates will be clearly posted on-site.

4.3 Duties and Responsibilities of Emergency Coordinators

The Emergency Coordinator is responsible for the review of existing materials, storage of materials and the necessary recommendations/upgrades to update the PPC Plan, if appropriate.

If the Emergency Coordinator determines that the site has had an emission, discharge, fire, or explosion, which would threaten human health or the environment, the Emergency Coordinator must immediately notify:

- Southwest Region of the Pennsylvania Department of Environmental Protection (412-442-4000);
- North Region of the Pennsylvania Department of Environmental Protection (814-332-6945)
- National Response Center (800-424-8802); and the
- Pennsylvania Emergency Management Agency (717-651-2001); and report the following:
 - Name of person reporting incident,
 - Name and location of the facility,
 - Phone number where the person reporting the spill can be reached,
 - Date, time, and location of the incident,
 - A brief description of the incident, nature of the materials involved, extent of injuries, and potential effects on health or the environment,
 - Estimated quantities of the materials involved, and
 - The extent of contamination of land, water, or air, if known.

During an emergency, the Emergency Coordinator must take all reasonable measures necessary to ensure that fire, explosion, emission, or discharge do not occur, reoccur, or spread to other materials or wastes at the site. These measures shall include, where applicable, stopping operations, collecting, and containing released materials or wastes, and removing or isolating containers.

If the facility ceases operations in response to a fire, explosion, emission, or discharge, the Emergency Coordinator must ensure that adequate monitoring is conducted for leaks, pressure buildup, or ruptures in valves, pipes, or other equipment, wherever it is appropriate.

4.3.1 Duties after an Emergency

Immediately after an emergency, the Emergency Coordinator, with Pennsylvania Department of Environmental Protection (PA DEP) approval, must provide for treating, storing, or disposing of residues, contaminated soil, etc., from an emission, discharge, fire, or explosion at the site.

The Emergency Coordinator must ensure that in the affected areas of the site, no material or waste incompatible with the emitted or discharged residues is processed stored, treated, or disposed of until cleanup procedures are completed; and, all emergency equipment listed in the plan is cleaned and fit for its intended use before operations are resumed.

Within fifteen (15) days of the incident, the facility will submit a written report on the incident to the PA DEP.

4.4 Company Officials

The Emergency Coordinator will notify the following company officials, if appropriate:

Range Resources – Company Officials

Name	Title	Telephone Number
Mr. John Applegath	Vice President - Drilling	(724) 678-7054
Mr. Matt Curry	Completions Manager	(724) 678-8051
Mr. Steve Rupert	Vice President - Production	(330) 280-1030
Mr. Ray Walker	Vice President – Shale Appalachia	(724) 822-0916

5.0 SPILL OR LEAK PREVENTION AND RESPONSE

5.1 Pre-Release Planning

The sources for potential spills/leaks for these sites are from aboveground storage tanks, impoundment ponds, drum and intermediate storage containers which are summarized in Table 5.1.

The properties where most sites reside are situated on gentle slopes though all efforts will be to remain on level property. Where the landscape is sloped, the natural flow would be in any given location. Pre-planning addresses the potential hazards and ensures that measures will be taken to minimize any exposures which may occur. Therefore, most small spills would not travel far over the porous gravel ground surface.

GENERAL DESCRIPTION OF LOCATION

The location of each well site is defined in the Drilling Permit Application and depicted in the adjoining topography map. However, each road and site pad will be constructed in a manner which minimizes the disturbance of land and will follow E&S Best Management Practices. The traveled areas will maintain a top layer of rock to stabilize the property.

Any impoundments will be designed in a manner to maintain an interior slope of 3.5:1; exterior slopes of 2:1; bottom slopes of 1% and a berm width of 15 ft. An attached example is attached as Appendix C

5.2 Pollution Incident Prevention Practices

5.2.1 Fail Safe Engineering

There are many safeguards instilled into the operation to prevent the accidental discharge of material. Many of the storage tanks are equipped with means to gauge the volume. Secondary containment according to the contractor's SPCC will be enacted to ensure that any spills are contained. See Section 5.2.3 The BOPs will be operable during activities involved in the drilling and completion of the well to prevent blowouts should excess back pressure be experienced.

5.2.2 Preventive Maintenance

Preventative maintenance involves the regular inspection and testing of the equipment and operational systems. A preventative maintenance program emphasizes the upkeep and maintenance of systems, which could, upon breakdown or failure, result in conditions that could cause environmental degradation or endangerment of public health and safety. If any deficiencies and/or leaks are discovered during the following preventative maintenance activities, the deficiencies are promptly corrected and any spilled material is immediately cleaned up. Site Inspection Checklist Forms are included in Appendix B.

- **Visual Observations** - The site is manned 24 hours a day and visual inspections will be conducted throughout.
- **Detailed Inspections and Monitoring**— See Section 5.4, Inspection and Monitoring Program for a list of detailed inspections.

5.2.3 Discharge and Drainage Control

- **Secondary Containment**

- Two to three above ground storage tanks with volumes of 210 bbls (8820gal) each will utilize secondary containment as defined in the SPCC
- Frac tanks will vary in volume according to the requirements of the project. Those containing any hazardous materials will be diked accordingly to minimize run off.
- **Vapor Control**
 - Provided by pressure relief valves/fittings as appropriate.
- **Dust Control** (Not applicable at this operation)

5.2.4 Mitigation

Personnel are provided with proper protective clothing and eyewear. Cleanup will be performed with brooms, shovels, and absorbent materials for small spills, and outside contractor services for large spills.

5.2.5 Ultimate Disposition of Contaminated Materials

All contaminated soils, sorbents, and waters are disposed of through properly permitted subcontractors.

5.3 Material Compatibility

Materials held in inventory are stored properly to ensure material compatibility. Incompatible materials should be recognized and individuals working at the facility should be properly informed through signage, training, etc.

An inventory of the materials stored at the facility was taken and the corresponding Material Safety Data Sheets were collected. The chemicals comprising the Engine oil, Hydraulic fluid, Methanol Inhibitor, and Antifreeze were entered into a chemical reactivity prediction program. The Chemical Reactivity Worksheet Version 1.9, developed by the CAMEO (Computer Aided Management of Emergency Operations) Team at the Hazardous Materials Research Branch of the Office of Response and Restoration at the National Oceanographic and Atmospheric

Administration (NOAA) and the Chemical Emergency Prevention and Preparedness Office at the U.S. EPA was used to predict if a reactivity hazard may occur from a scenario where two materials were mixed. The computer model did not predict any unsafe reactions between the materials kept in inventory. The computer model cannot predict reactions from three or more chemicals mixing at once.

5.4 Inspection and Monitoring Program

Inspections are made to check for leaks and potential hazardous areas and are documented on the checklist provided in Appendix B of this Plan. Specific inspections are performed as follows:

- Observing the exterior of ASTs, and other equipment for signs of deterioration, leaks, corrosion, and thinning.
- Checking the inventory of discharge response equipment and restocking as needed.

AST integrity inspections should be performed at intervals and specifications according to industry standards for the type of tanks present at the facility.

5.5 Brittle Fracture Evaluations and Preventive Maintenance

There are no field-constructed tanks that will be on site.

- Leaks in containment systems, tanks and piping
- Proper function of transfer pumps and isolation valves
- Condition of material handling equipment

The above will be inspected for conditions, which could result in contamination of the work area or environment. Preventative maintenance will be performed on any areas found to be deficient. This corrective action will be accomplished and documented. This documentation and the original inspection report will be retained in accordance with the requirements of this plan.

5.6 Housekeeping Program

The following items will be performed as part of facility housekeeping:

- Equipment, packaging materials, and miscellaneous materials will be inspected for leaks, oily surfaces, etc. Deficiencies shall be promptly corrected.

- Areas where materials are unloaded, transferred, or loaded will be kept free of debris.
- Cleanup, storage, disposal, and inspection procedures will be reviewed with facility personnel as part of the training requirements of this plan.
- Housekeeping conditions will be included in the facility inspections conducted in accordance with this plan.

5.7 Security

During various activities in the development of the well-site, there will be a need for security to be present at the entry point to the well site. During these periods, visitors are to be required to sign in and authorization will be required should they arrive unexpectedly. Only authorized personnel will be allowed on the site. When security personnel are not on site to guard the entrance, Range's person in charge on-site will be responsible for managing personnel arriving on site.

5.8 External Factor Planning

Employees are trained in procedures that are in place for emergency situations. Power outages, floods, and/or snowstorms may prevent operations from continuing, but should not present the circumstances for an event to occur that would have an adverse effect on public health or the environment. Power outages do not increase the likelihood for release of pollutants and do not affect spill prevention measures, or spill containment, cleanup, and removal operations.

In the event of an external emergency situation, no operations involving regulated material transfer will be initiated at the site.

5.9 Training Program

Employee training shall be conducted periodically to ensure that all responsible employees are knowledgeable of emergency and spill response procedures. All employees with responsibilities under this plan shall receive annual training in the following areas, as required:

- Knowledge of the basic hazard and risk assessment techniques.

- Know how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
- Know how to implement basic decontamination procedures.
- An understanding of the relevant standard operating procedures and termination procedures.

Employees completing the training shall be capable of demonstrating competency in the above training elements. Elements of the plan that enhance the prevention and management of environmental and safety incidents should also include and provide for training in these areas:

- Housekeeping
- Material Management Practices
- Loading and Unloading Procedures
- Site Emergency and Evacuation Procedures
- Preventative Maintenance
- Visual Inspections

This training shall be documented and included in the employee personnel files. A sufficient number of personnel shall be trained to ensure that personnel are capable of responding effectively to emergencies and to satisfactorily accomplish an evacuation of the facility if required.

6.0 COUNTERMEASURES

6.1 Countermeasures to be Undertaken

Spills of liquid material (mineral oil or aliphatic hydrocarbon) may occur from storage tanks, flow loop, equipment leaks, or spills during transfer. In the event of a spill or release, designated personnel will take the following steps:

6.1.1 Petroleum-Based Release or Hazardous Material Response Procedures: Minor Release

In the event of a minor release of oil or petroleum product to the environment, the following emergency response procedure will be conducted. A minor release is defined as a release of less than 25 gallons of oil product and/or less than the reportable quantity of a material to an aboveground surface, is contained to the immediate area and does not adversely impact human health and the environment, and **does not immediately threaten groundwater or surface water**. In the event of a minor release, the following procedure will be conducted if personal safety is not at risk:

- Upon discovering a spill, the employee must immediately notify the Emergency Coordinator.
- The Emergency Coordinator will determine if the spill cleanup is within the capabilities of the Range Resources personnel to contain.
- The Emergency Coordinator may initiate the following activities, if deemed appropriate:
 - Shutdown all facility operations; and
 - Invoke evacuation of the facility.
- If the determination is made that Range Resources personnel can respond to the spill safely, then booms, spill stoppers, and absorbent materials will be deployed to contain the spill and prevent the released material from migrating.
- The Emergency Coordinator will make the necessary notifications to key Range Resources personnel, local emergency agencies, and the spill response contractor, as required.

- Call a spill response contractor listed in Section 7.1, if the on-site personnel are unable to control the release or if cleanup is necessary.
- Notify the National Response Center (1-800-424-8802) to report the release if the released material is capable of reaching navigable waters. A listing of the Emergency Response telephone numbers is provided in the Section 7.1 and 7.2.
- Assess the area to ensure that human health and environmental hazards have been mitigated.
- Complete an incident report and update the PPC Plan and the SPCC Plan. Refer to Appendix A for a copy of the Incident Report Form.

6.1.2 Petroleum-Based Release or Hazardous Material Response Procedures: Major Release

A major release is defined as a release of **25 gallons or greater** of oil product and/or over the reportable quantity of a material to the environment or the release **immediately threatens groundwater or surface water**. In the event of a major release and the material cannot be controlled, contained or mitigated by facility personnel, the following procedure will be implemented:

- If imminent danger exists, immediately notify everyone at the facility. Engage appropriate evacuation procedures, as necessary.
- Upon discovering a spill, the employee must immediately notify the Emergency Coordinator.
- The Emergency Coordinator will determine if the spill cleanup is within the capabilities of the Range Resources personnel to contain.
- The Emergency Coordinator may initiate the following activities, if deemed appropriate:
 - Shutdown all operations; and
 - Invoke evacuation of the site.
- If the determination is made that Range Resources personnel can respond to the spill safely, then booms, spill stoppers, and absorbent materials will be deployed to contain the

spill and prevent the released material from entering the nearest down-gradient storm drain.

- The Emergency Coordinator will make the necessary notifications to key Range Resources personnel, local emergency agencies, and the spill response contractor, as required.
- Call a spill response contractor listed in Section 7.1, if the on-site personnel are unable to control the release or if additional cleaning is necessary.
- Notify the National Response Center (1-800-424-8802) to report the release if the released material is capable of reaching navigable waters. A listing of the Emergency Response telephone numbers is provided in Section 7.1 and 7.2.
- Contain the released product with all available equipment. All spent absorbent material will be placed in appropriate containers and properly transported off-site for disposal.
- Assess the area to ensure that human health and environmental hazards have been mitigated.
- Complete an incident report and update the PPC Plan and SPCC Plan. Refer to Appendix A for a copy of the Incident Report Form. Notify the Emergency Coordinators and/or Acting Emergency Coordinators. A listing of the Emergency Response telephone numbers is as follows.
 - **Spill response contractor** listed in Section 7.1, if the on-site personnel are unable to control the release or if cleanup is necessary.
 - **National Response Center (1-800-424-8802)** to report the release if the released material is capable of reaching navigable waters.
 - **Pennsylvania Department of Environmental Protection (PADEP) (412-442-4000) or (814) 332-6945** within 30 minutes of a major release.
 - **Pennsylvania State Police (911)** within 30 minutes of a major release.

6.2 Countermeasure to be Undertaken by Contractors

A release that cannot be contained, controlled, and/or cleaned up by on-site personnel will require assistance from an emergency contractor listed in Section 7.1. The emergency contractor will take all necessary measures to contain, control, and/or clean up the release.

6.3 Internal and External Communications and Alarm Systems

During a spill or release, cellular telephones, 2-way radios, voice, and/or hand signals are utilized to provide immediate instruction to facility personnel. Telephones are utilized to communicate with emergency contractors and emergency response agencies in the event of a spill or release.

6.4 Evacuation Plan for Facility Personnel

In the event of a spill or release beyond a minor incident, all visitors and personnel not essential to the control and cleanup operations will evacuate the area. These individuals will exit the facility through the nearest available exit and proceed to the assembly point identified by the Emergency Coordinator (if possible, an area upwind and uphill from the incident). Employees can exit the facility by means of one (1) access road and travel in either direction along public roads to a place of safety. Signals used to begin evacuation will be voice or radio. At the assembly point, the Emergency Coordinator or their designee will be responsible for a head count to ensure that all personnel have been accounted for.

6.5 Emergency Equipment Available for Response

Emergency equipment is maintained in proper working order, clearly labeled, and strategically stored strategically. Emergency equipment includes, portable fire extinguishers (periodically tested), Spill control equipment, and first aid supplies. The spill control equipment is maintained in spill kits containing the following materials.

- 55 Gallon Drum
- Personal Protective Equipment- Nitrile gloves, Poly Tyvek, Overboots
- Oil absorbent pads, 4" oil absorbent boom, and oil absorbent granular floor dry.

If additional equipment is needed, an Emergency Response Contractor listed in Section 7.1 will be contacted to assist in containment and cleanup efforts.

After an emergency, all the equipment used will be decontaminated, cleaned, and inspected for proper working order before normal operations resume.

6.5 Emergency Equipment Maintenance and Decontamination

All equipment used for emergency procedures shall be kept in satisfactory condition and maintained and or replaced as needed. All contaminated tools or equipment shall be properly cleaned or disposed of. Emergency equipment shall be tested for proper working order and be replaced as necessary.

6.6 Disposal

Waste oils, fuels, and contaminated rainwater collected at the facility as a result of a spill that cannot be recovered will be properly disposed of at an appropriately permitted facility. Disposal Sites in which produced water disposed of are as follows:

Liquid Assets Disposal (LAD)

New Castle Environmental

Franklin, PA Brine Treatment Plant

Punnetton Liquids

Eureka Resources

6.7 Regulatory Agency Reporting

An incident report form in Appendix A, will supply required information for federal, state, and local authorities as required.

6.7.1 Federal Reporting

The facility will notify the appropriate regulatory agencies and submit the current Spill, Prevention, Control, and Countermeasures (SPCC) Plan to the USEPA Region III Regional Administrator and other appropriate regulatory agencies if either of the following occurs at the subject site:

- The site discharges more than 1,000 gallons of oil into or upon the navigable waters of the United States or adjoining shorelines.
- The site discharges oil over 42 gallons in two spill events within any 12-month period.

The following information will be provided within 60 days of a reportable spill:

- Name of the facility,
- Name(s) of the facility owner/operator,
- Location of the facility,
- Date and year of initial facility operation,
- Maximum oil storage or handling capacity and daily throughput,
- Description of facility, including maps and diagrams,
- Complete copy of the PPC and/or SPCC and amendments,
- Cause of the spill, including failure analysis, and
- Corrective actions and/or countermeasures taken.

6.7.2 State Reporting

An incident report form that will supply required information for federal, state, and local authorities is included in Appendix A.

Within fifteen (15) days of the incident, the Facility will submit a written report to the PA DEP if either of the following occurs at the subject site:

- The facility discharges any quantity of oil or regulated substances that immediately threaten groundwater or surface water.
- The facility discharges at least 25 gallons of oil or a regulated substance onto an aboveground surface.
- A release of a hazardous substance to an aboveground surface that exceeds its reportable quantity under the Comprehensive Environmental Response, Compensation, and Liability (CERCLA) Act of 1980 and 40 CFR Part 302 (relating to designation, reportable quantities, and notification).

The following information will be provided within 15 days of a reportable spill:

- Name, address, and telephone number of the installation,
- Date, time, and location of the incident,
- A brief description of the circumstances causing the incident,
- Description and estimated quantity by weight or volume of materials or wastes involved,
- An assessment of any contamination of land, water, or air, which has occurred due to the incident,
- Estimated quantity and disposition of recovered materials or wastes that resulted from the incident, and
- A description of what actions the installation intends to take to prevent a similar occurrence in the future.

6.8 Fire Suppression System

Fire extinguishers are inspected periodically. The locations of these extinguishers are placed in strategic locations throughout the site. All fire extinguishers on site are compliant with American National Standards Institute (ANSI) criteria for responding to ABC class fires. These systems will be used only for small and immediately confined (first responder) fires. In all other incidents, the local Fire Department listed in Section 7.1 will be contacted to combat the fire.

6.9 Medical and Fire Emergency Plans

In the event of a medical emergency, the Emergency Coordinator must request outside emergency medical services and transportation to local hospital emergency room. Refer to Section 7.1 for emergency contact phone numbers. Contaminated individuals will be removed from the site and gross contamination will be removed by taking or cutting off their clothing.

If there is imminent danger, the Emergency Coordinator will evacuate personnel. Upon evacuation of the site, all employees, except those with emergency responsibilities, are to go to a location designated by the Emergency Coordinator which is upwind of the incident location and remain there until a head count can be taken. Under no circumstances are employees to go home until given approval to do so by the Emergency Coordinator or a designated representative.

7.0 EMERGENCY SPILL CONTROL NETWORK

7.1 Arrangements with Local Emergency Response Agencies and Hospitals

In the event of an accident, spill, or release requiring outside assistance, the following emergency response contractors, agencies, and hospitals are available to assist the facility.

Medical Agencies	
Washington Hospital	(724) 225-7000
Ohio Valley Hospital	(740) 283-7000
Canonsburg Hospital	(724) 745-6100
Washington Hospital – Burgettstown Medical Plaza	(724) 947-6261
Southwest Regional Medical Center	(724) 627-3101
St. Clair Hospital	(412) 561-4900

Ambulance Service	
South Franklin Township Ambulance and Chair	(724) 225-8050
Fort Cherry Ambulance	(724) 926-7200

Emergency Contacts	
All Emergencies	911
Waynesburg Fire Department	(724) 627-5426
Chartiers VFD	(724) 745-9477
Fire: Hickory Fire Department	(724) 356-7801
Police: Hickory Police	(724) 356-7917

Emergency Response Contractors		
Spills: Weavertown Environmental Group Alex E. Paris		(800) 746-4850
		(724) 947-2235
Pipelines: Alex E. Paris TEAM Industrial Services Inc.		(724) 947-2235
		(800) 662-8326

7.2 Notification Lists

The Emergency Coordinator will notify the following company officials, as appropriate:

Range Resources – Company Officials

Name	Title	Telephone Number
Mark Hansen	Vice President - EHS	(817) 869-4217
Ray Walker	Vice President – Shale Appalachia	(724) 743-6700

The following list of government agencies and emergency organizations will be notified, as required, depending on the emergency and required response:

Emergency Management Contacts

Reporting Agency	Telephone Number
Weavertown Environmental 24-Hour Emergency Response	(800) 746-4850
Alex E. Paris 24-Hour Emergency Response	(724) 947-2235
County of Emergency Management Agency Washington County [Monday – Friday 8:30 a.m. – 4:40 p.m.] *Nights and weekends all calls are forwarded to 911	(724) 228-6911
PA DEP Regional Office	(412) 442-4000
PA Emergency Management Agency	(717) 783-8150
PA DEP Emergency Hotline	(800) 541-2050

National Response Center (Only if the spill leaves the property and is likely to enter navigable waters)	(800) 424-8802
PA Fish Commission Waterways Patrolman	(814) 445-8974

A written follow-up requirement is required within 15 days after reporting the spill. This written report should be mailed to the agencies with the exception of the National Response Center, which does not require a written follow-up. An incident report form that will supply all of the required information for federal, state, and local authorities and mailing addresses is included in Appendix A.

7.2.1 Notification Protocol

The following narrative should be followed for making initial verbal contact with any Emergency Agency:

"This is *[state your full name]* with Range Resources – Location Coordinates. We have an emergency. Our emergency is a *[specify type of emergency.]*"

FOR PRODUCT SPILL:

It is estimated that *[state quantity]* of *[state product]* has been released.

The spill is *[contained/not contained]*.

The release occurred at *[state time – a.m./p.m.]* and lasted for approximately *[state period of time]*.

The medium or media into which the release occurred is *[state air, water, ground etc.]*.

The number of people known to be involved in the emergency is *[state number]*.

There are *[state number]* of injuries known at this time.

WAIT FOR OTHER PARTY TO HANG UP FIRST!

7.3 Downstream Notification

Not applicable at this facility.

8.0 STORMWATER MANAGEMENT ACTIVITIES

No stormwater drains are located at the sites identified in the Drilling Permit Application. Intermittent or perennial waterways within the anticipated area of influence, in the event of a release at the site, will be identified and mitigated

The procedures for site housekeeping and inspections programs, are considered to be reasonable and appropriate, and are consistent with Best Management Practices for this type of site in regards to stormwater management.

9.0 EROSION AND SEDIMENTATION PREVENTION

During construction or land disturbance the control of sediment migration and erosion is addressed by installing silt fences where appropriate and promptly covering disturbed land with topsoil and seed.

The E&S Control Report will contain the following:

General Information	Ditch Details
Project Description	Maps & Plans
Erosion & Sedimentation Control	Access Road Plan
Staging of Activities	Well Site Plan
Maintenance Program	List of Symbols
Seeding, Mulching & Soil Conditioning	
Hydrology	
Soil Maps	
Soil Information	
Location Map	
Exhibits	
Access Road Construction	
Construction Entrance	
Roadway Drainage	
Culvert Installation	
Broad Based Dips	
Filter Fabric Construction	
Straw Bale Filters	

10.0 ADDITIONAL REQUIREMENTS FOR EPCRA SECTION 313 FACILITIES

Not applicable. The site does not meet the criteria for EPCRA Section 313 reporting.

11.0 SIGNATORY REQUIREMENTS

The Preparedness, Prevention and Contingency Plan certification signature is included in Section 1 and signed by a signature authority as required.

12.0 PLAN REVISION AND RECORD RETENTION

The following documents related to this Preparedness, Prevention and Contingency Plan shall be kept on file for a period no less than three years:

- Inspections Records
- Corrective Action Documentation
- Training Records
- Annual Inspection Reports
- Spill Reports

This plan shall be amended whenever:

- There is a change in site construction, operation, or maintenance that may affect the discharge of significant quantities of pollutants to water, air, or land of the state.
- If a site inspection indicates the need for a plan amendment.
- If the project is found to be in violation of any of the discharge permit conditions.

A record of amendments and description of the amendments shall be signed by the Signature Authority and maintained in accordance with this section. This is included in Section 2.

Appendix A

Appendix B

Appendix C

Appendix D

Emergency Spill Plan

The purpose of this portion of the PREPAREDNESS PREVENTION AND CONTINGENCY PLAN (PPC) is ensure that adequate engineering controls are assessed and utilized to minimize the potential of a spill being created due to a failure. This protocol allows for the standard practice of defining a quality control process or process safety management which assesses the process flow as a means to maintain continuous improvement during the fracing process. The Management of Change procedure will be implemented to ensure that like parts are utilized and an approval of the change has been authorized by a competent Range Resources representative. In order to achieve this, the processes will be separated into various sections that have the potential to have a spill. For each section, the process control, engineering review of equipment and means to ensure that all contractors and Range Resources' personnel are ware of the processes involved and are trained accordingly. The

The quality process will highlight the following areas:

TRAINING

Contractor: Range Resources will provide documented training on the PPC to ensure that all contractors are aware of its function and issue them a traceable copy (controlled document). Each copy of the PPC will be assigned a number referencing that contractor's name. A log of the issuance will be maintained by the Range Safety Department in Canonsburg, PA. Emphasis will be placed on the contractor to ensure that their copy will be present within their employees' reach when conducting business for Range. Copies of the issued PPC can be reproduced and distributed to their employees.

It is the responsibility of the contractor to provide training to their employees that will be in a position that requires them to act in the event of a release (leak or spill). These employees will need to understand the function of the PPC along with the reporting structure that must be followed. Range has the right to ensure that these employees are following the protocol established to ensure that failures do not occur; failure to follow these work requirements could be subject to the ability to further conduct business with Range.

Contractor Employees: In an effort to eliminate the potential for releases, it is the responsibility of the contractor to provide adequate training to its employees that provides them

with a level of competency to perform their tasks proficiently. Each employee should be able to understand and recognize hazards within their areas of operation that could pose harm to personnel or the environment. Employees should be able to recognize that specified equipment is being installed and has the right to ensure that any substitutions of equipment or materials follow an approved Management of Change process.

Any new employees hired by the contractor must be trained on the PPC process. The contractor will be subject to audit by Range at any time to ensure that complete records are being maintained. It is the responsibility of the contractor to ensure that this procedure is being followed.

WATER TRANSFER

The transfer of fluids maintains the largest risk pertaining to the potential

From Water Storage Impoundment to another Impoundment

From Water Storage Impoundment to Well Pad Storage Tanks

Well Pad Storage Tanks to Blender

From Wellhead to Flowback Tanks

From Flowback Tanks to Water Storage Impoundment

From Flowback Tanks to Production Storage Tanks

PROCESS CONTROL

Process control is a means of identifying the type of work being performed, materials to be required and a plan to install or rig up such equipment. The process will require that the flow material be engineered to meet the specifications set forth by Range for the task at hand.

Range expects for its contractors to be able to professionally engineer a process that identifies materials required that will perform the needs taking into account terrain, location size, restrictions, and weather conditions as well to eliminate failure. Any additional fail-safe measures should always be recommended as new technologies are developed to minimize risk.

MANAGEMENT OF CHANGE

In formalizing a substitution process for equipment or materials, Range will utilize a process taken from Process Safety Management (29 CFR 1910.199). The use of Management of Change requires the need to ensure that the items being replaced have been selected based on their ability not to compromise the specification of the original equipment or materials. Therefore, accurate specifications of the original equipment must be maintained. Once a replacement product has been selected, the Management of Change must be approved by a Range representative. In some cases, supportive documentation may be requested.

Management of Change not only addresses maintenance but it also addresses what should be done should a change in the process itself be required. An approval of the change would still be documented and required by a Range representative. All personnel involved in the process will need to be trained in the understanding of the change and what modifications will need to be made.

ENGINEERING STUDY OF EQUIPMENT

The type of equipment being used to conduct the process will need to be selected based on the performance required. The specifications will be the responsibility of the contractor. The contractor will mark all transfer equipment with the pressure ratings, classification and owner's name on each section. The transfer equipment previously described are the sections of transfer piping, fittings or fluid transfer hoses. All gasket materials used to make connections must be inspected prior to each use in order to assure integrity. Any gaskets not deemed to be suitable will be replaced immediately.

Any connections that require mechanical means to secure them should ensure that the instruments are functional. Any plumbing that can become loose due to vibration must use locking mechanisms. The type of the mechanisms utilized should be engineered to maintain their integrity throughout the project.

WORK PRACTICES

The tasks being conducted by all personnel in the operation are responsible to ensure that breaches are immediately address once discovered. During the Job Safety Analysis or Hazard Assessment Analysis, potential non-conformities will be identified and a means to

monitor will be discussed. Personnel assigned to other duties may be asked to maintain vigilance on any equipment in their view of site or designated area. All personnel conducting tasks on the worksite must be competent in the performance of their duties. Certain job tasks require certification. Any employee conducting these functions must have current valid certifications for specified equipment type being operated where applicable.

Any SSEs (Short Service Employees) that are working in the area will be assigned a mentor who will conduct on the job training. The mentor must ensure that the SSE comprehends the task being assigned and can carry it out proficiently. The SSE should not be allowed to operate any equipment unless they have been authorized to by the mentor or a qualified person.

STOP WORK authority is a practice that allows any employee with any company on the work site to stop the work being performed should there be imminent danger associated with any task being performed. This practice gives authority to all individuals to monitor the worksite and make decisions that can prevent the damage to the environment, equipment or injury to any employee. The incentive for this practice is to encourage personnel to look for situations that can cause a disruption to the operation without retribution.

REPORTING STRUCTURE

Non-Conformance

Corrective Measures

DISPOSAL

The disposal of any liquid residual waste will be in accordance to those sites mentioned in Section 6.6 under Countermeasures of this document. These facilities have already been identified and authorized by Range Resources Regulatory Department and should not be deviated from.

Solid waste will be diagnosed to determine if any hazards exist and will be disposed of according to local regulations. Identified Emergency Management contactors will be responsible for following regulations to ensure that Range complies accordingly. Any discrepancies or

clarifications must received approval from Range's Regulatory Department prior to movement of the solid waste.

PREPAREDNESS PREVENTION AND CONTINGENCY PLAN (PPC) WASHINGTON COUNTY

Range Resources Appalachia, LLC
380 Southpointe Blvd., Suite 300
Canonsburg, PA 15317

January, 2009
Revised October 2009

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1.0 EXECUTIVE SUMMARY

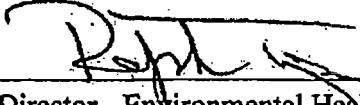
This Preparedness Prevention and Contingency (PPC) Plan is prepared for Range Resource Corporation's operations in Washington County, Pennsylvania. The sites are identified in the drilling permit applications, which will be located in Washington County. This PPC Plan was developed in accordance with PA DEP Guidelines #400-2200-001/September 2001, *Guidelines for the Development and Implementation of Environmental Emergency Response Plans*.

This PPC Plan is an integral part of the operation's environmental, health and safety program. It is designed to provide for foreseeable workplace occurrences and provide the response framework for those occurrences, which have the potential for employee injury or environmental damage. It contains program elements designed for prevention/control of accidental discharges of regulated substances. Further, the plan is designed to be flexible, with established guidelines, and will be reviewed on a regular basis to assure the plan is a current, viable, and useful tool.

Mr. Ralph Tijerina is the administrator of this PPC Plan and is responsible for implementation and maintenance. Reviews and revisions of this plan will be completed annually unless plan failure, operational changes, or regulatory revisions necessitate otherwise. Any questions, comments, or suggestions regarding this PPC Plan should be directed to Mr. Ralph Tijerina.

Authorized for Implementation:

Ralph Tijerina



Director - Environmental Health and Safety

10/14/2009

Date Implemented

2.0 PLAN REVIEW RECORD

The following table is a record of the periodic revisions made to this plan since the original date of plan implementation. It is required by the PADEP that the plan be reviewed annually. This plan will also be reviewed and revised if any of the following occur:

- An applicable regulation is revised;
- The plan fails in an emergency;
- There is a change in the design, construction, operation, or maintenance that materially affects the operation's potential for discharge;
- The list of emergency coordinators changes;
- The list of emergency response equipment changes; or
- As otherwise directed by an applicable agency.

Date	Revision	Signature	Comments
1-1-2009	1A		Update
10/2009	2		Added Appendix D and Appendix E and Updated Plan

3.0 DESCRIPTION OF SITES

3.1 Description of the Industrial or Commercial Activity

Activity to be conducted at these sites will include, but not be limited to, the construction of the access road to the well-site and the pad on which the drilling operation will be conducted, drilling of the borehole following the casing design and strategic analysis described in the Drilling Permit Application, completing and fracing of the well, flowback operations and production. The operation will be at various locations as described in the drilling permit applications for wells within Washington County. All coordinates for each borehole are stipulated in the drilling permit applications.

- The average constituents of the NGL are propane (18.28%), butane (24.59%), iso-butane (7.32%), and pentane and longer chain hydrocarbons (49.81%).
- The operation's North American Industry Classification Systems (NAICS) code is 211111 (Crude Petroleum and Natural Gas Extraction).

3.2 Description of Existing Emergency Response Plans

This plan is compatible with existing emergency response and spill prevention plans. The operations and subcontractors maintain a Spill Prevention Control and Countermeasure (SPCC) Plan compliant with 40 Code of Federal Regulations Part 112.

3.2.1 Assessments of Impacts on Downstream Water Supplies or Water Wells in Area

As part of the plan to ensure that no impacts occur to either downstream water supplies or water wells, an assessment of all water sources within a 1000 ft radius of the well site will be conducted by identifying the location and samples will be taken to establish a baseline for the water quality prior to any activity.

The samples will be collected and tested by a state certified water-testing laboratory in order to assure an independent objective assessment. These test results will be maintained in the well file for future reference if they are required for comparison to samples taken after our activity is completed.

Best Management Practices (BMPs) will be in place to prevent the contamination of any water supply either downstream surface water supply or an identified water well. Pre-drill water sampling will be conducting in accordance with established sampling and analytical protocols.

Well Control Guideline plans include the use of equipment to contain any large amounts of water which may be required to contain or control any fires should the need exist.

During the drilling and completion process, all returned fluids will be contained in a lined reserve pit, 500 bbl frac tanks, or large lined impoundments to prevent any run-off that could cause contamination to existing water wells or surface water.

3.3 Materials and Waste Inventory

3.3.1 Liquid Storage Description

- 5 gal pails
- 55 gal drums
- 500 gal intermediate bulk containers
- 20,000 gal max diesel storage

3.3.2 Dry Bulk Storage Description

- 50 lb sack chemicals
- 55 lb sack chemicals
- 100 lb sack chemicals
- 1 ton bulk bag

The following products are used for the operations described above, but are subject to change based on the circumstances encountered during the development of the project. The MSDS for each product are required to be on site while any chemical is staged on location.

MC M-8650	Pac L
MC MX 525-5	Polyac Plus
MCSS 5359	Diesel Oil
MC MX S-2510T	CI-14
B-8650	Ferrotrol 300L
S-2510T	XLW-32
K 34	GW-3LDF
HCL Acid Plus Inhibitor and Surfactant	GBW-20C
BC 140	BF-7L
Delta Frac 140FE-1A Acidizing Composition	GBW-15L
FR-46	FRW-14
HAI-OS Acid Inhibitor	FRW-25
Hydrochloric Acid 5-10%	Alpha-125
X-TEND II	Methanol
Sodium Chloride	40 HTL
Potassium Chloride	NE 100
Ultrahib	FE 100L
Ultracap	HVG-01
Polypac UL/ELV	B9
DUO-Vis/ XCD Polymer	BXL-2
Ultrafree	ICI-3240
M-I Bar	ICI-150
Aldacide G Antimicrobial	FRW-50
Bara-Defoam 1	FRW-25
Barazan D Plus	Iron Check
Bariod	Unilink
Bicarbonate of Soda	GBL-8X
Bore-Hib	Unigel 19XL
Bore-Plus	FRP-21
Bore-Vis	Bioclear 200
Bore-Vis II	AI-2
Calcium Hypochlorite -- Hydrated	IC-100L
Caustic Soda	OB-Fe
Citric Acid	Super OW-3
Clay Grabber	Super Pen 2000
Clayseal Plus	Super 100NE
Dextrid LT	Bioclear 200
	SAS-2

3.3.3 Waste

Waste accumulated on site will be collected and disposed of in the manner required by the Pennsylvania Department of Environmental Protection, dependent upon the classification. Waste will be minimized by the utilization of larger packaging containers. Where possible, intermediate bulk containers will be used as they can be reutilized instead of using drums thus resulting in minimal waste products.

Municipal Waste

Containerization via Waste Management

Produced/ Frac/ Pit Water

All produced water, including drilling water, flowback water, and produced brine will be collected and either disposed according to the appropriate regulations at a permitted disposal facility or underground injection well, or will be recycled. If being disposed at a permitted disposal facility or underground injection well, one of the following companies may be used to transport the water to one of the disposal sites identified in Section 6.6:

R.T.I.

Highland Environmental Sanitation

MJ Water Co, Inc

Woods Trucking

Ted Stutzman

Devonian Industries, Inc

Burkholtz Welding

Stallion Oilfield Services

Force

If the water is being recycled, the water will be either trucked to the appropriate impoundment or pumped through aboveground piping. If the water is being transported via trucking, one of the companies detailed above may be used to transport the water to the permitted impoundment. If the water is being pumped through aboveground piping, An RRC approved water transfer

contractor will be utilized to pump the water through the aboveground piping to the permitted impoundment.

3.4 Pollution Incident History

There is little history pertaining to any pollution incidents for the area covered by this PPC Plan. Completed records of past and future occurrences with spill reporting and response shall always be included in Appendix C.

Should a spill occur, the following information will be recorded and maintained for five years:

1. Date and time of incident;
2. Location of incident;
3. Name of individual discovering the incident;
4. Product released and amount released;
5. Causes of the spill, including failure analysis;
6. Corrective actions and/or countermeasures taken and additional preventative measures taken or contemplated.

3.5 Implementation Schedule for Elements Not Currently In Place

As of the signature dates on page 1 of this plan, all elements of this plan are currently in place.

4.0 DESCRIPTION OF HOW PLAN IS IMPLEMENTED BY ORGANIZATION

4.1 Organizational Structure of Facility for Implementation (Pollution Prevention Team)

The operational headcount on site will be no more than 30 personnel at any given time which includes both Range Resources Corp and its subcontractors. The primary emergency coordinator's duties and responsibilities will be as follows:

1. Risk management and inventory of materials,
2. Establishment of all spill-reporting duties,
3. Implementation of visual inspection procedures,
4. Review of past incidents and actions taken,
5. Implementation of plan goals,
6. Coordinate all spill clean-up activities,
7. Notification of all necessary authorities,
8. Education and training of all on-site personnel,
9. Evaluation of plan and change as needed,
10. Review any changes relative to the current plan,
11. Evaluate overall effectiveness of plan, and
12. Review and update the plan on a regular basis and make changes as necessary.

Changes made to the plan which affect personnel will be communicated at the earliest available time, generally during safety meetings and put into practice as part of standard operating procedures, where necessary. Where mentoring or extended training is required for the individuals to gain experience, a mentoring system will be put in place and On-The-Job training will be documented.

4.2 List of Emergency Coordinators

The following table shows a list of the Emergency Coordinators for Range Resources Appalachia, LLC, Washington County.

All calls to report an emergency or contact one of the Emergency Coordinators should be to:

(866) 768-4756

Emergency Coordinators

Name	Title
Mr. Ralph Tijerina	Director - Health, Safety and Environmental
Mr. Craig Wyda	Sr HSE Technician
Mr. Mike Farris	Manager – Health, Safety, and Environmental

In the event the Primary Emergency Coordinator is not present at the time of an emergency, the designated alternate individuals will accept those responsibilities.

In the rare event none of the above personnel are present; the ranking supervisor on-site will be in charge of the facility until the appropriate personnel can be contacted. All supervisory personnel who may be in charge of the facility will be trained in the proper response procedures in the event of an emergency.

Emergency phone numbers along with site lat/long coordinates will be clearly posted on-site.

4.3 Duties and Responsibilities of Emergency Coordinators

The Emergency Coordinator is responsible for the review of existing materials, storage of materials and the necessary recommendations/upgrades to update the PPC Plan, if appropriate.

If the Emergency Coordinator determines that the site has had an emission, discharge, fire, or explosion, which would threaten human health or the environment, the Emergency Coordinator must immediately notify:

- Southwest Region of the Pennsylvania Department of Environmental Protection (412-442-4000);
- Pennsylvania Department of Environmental Protection Oil & Gas Inspector;
- National Response Center (800-424-8802); and
- Pennsylvania Emergency Management Agency (717-651-2001); and report the following:
 - Name of person reporting incident,
 - Name and location of the facility,
 - Phone number where the person reporting the spill can be reached,
 - Date, time, and location of the incident,
 - A brief description of the incident, nature of the materials involved, extent of injuries, and potential effects on health or the environment,
 - Estimated quantities of the materials involved, and
 - The extent of contamination of land, water, or air, if known.

During an emergency, the Emergency Coordinator must take all reasonable measures necessary to ensure that fire, explosion, emission, or discharge do not occur, reoccur, or spread to other materials or wastes at the site. These measures shall include, where applicable, stopping operations, collecting, and containing released materials or wastes, and removing or isolating containers.

If the facility ceases operations in response to a fire, explosion, emission, or discharge, the Emergency Coordinator must ensure that adequate monitoring is conducted for leaks, pressure buildup, or ruptures in valves, pipes, or other equipment, wherever it is appropriate.

4.3.1 Duties after an Emergency

Immediately after an emergency, the Emergency Coordinator, with Pennsylvania Department of Environmental Protection (PA DEP) approval, must provide for treating, storing, or disposing of residues, contaminated soil, etc., from an emission, discharge, fire, or explosion at the site.

The Emergency Coordinator must ensure that in the affected areas of the site, no material or waste incompatible with the emitted or discharged residues is processed stored, treated, or disposed of until cleanup procedures are completed; and, all emergency equipment listed in the plan is cleaned and fit for its intended use before operations are resumed.

Within fifteen (15) days of the incident, the facility will submit a written report on the incident to the PA DEP.

4.4 Company Officials

The Emergency Coordinator will notify the following company officials, if appropriate:

Range Resources – Company Officials

Name	Title	Telephone Number
Mr. John Applegath	Vice President - Operations	(724) 678-7054
Mr. Matt Curry	Director – Engineering and Development	(724) 678-8051
Mr. Scott Roy	Vice President – Government and Regulatory Affairs	(717) 329-3441
Mr. Ray Walker	Vice President – Shale Appalachia	(724) 822-0916

5.0 SPILL OR LEAK PREVENTION AND RESPONSE

5.1 Pre-Release Planning

The sources for potential spills/leaks for these sites are from aboveground storage tanks, impoundment ponds, drum and intermediate storage containers, and above ground piping which are summarized in Table 5.1.

The properties where most sites reside are situated on gentle slopes though all efforts will be to remain on level property. Where the landscape is sloped, the natural flow would be in any given location. Pre-planning addresses the potential hazards and ensures that measures will be taken to minimize any exposures which may occur. Therefore, most small spills would not travel far over the porous gravel surface.

GENERAL DESCRIPTION OF LOCATION

The location of each well site is defined in the Drilling Permit Application and depicted in the adjoining topography map. However, each road and site pad will be constructed in a manner which minimizes the disturbance of land and will follow the Erosion and Sedimentation Control Plan, and where applicable, the ESCGP-1 permit. . The traveled areas will maintain a top layer of rock to stabilize the property.

Any centralized impoundments will be designed and constructed in a manner to maintain an interior slope of 3 horizontal to 1 vertical (3H:1V); exterior slopes of 3H:1V; a bottom slope of approximately 1% and a minimum berm width of 12 ft. These standards are the minimum standards for these types of impoundments and will follow the guidelines developed and required by the PA DEP.

5.2 Pollution Incident Prevention Practices

5.2.1 Fail Safe Engineering

There are many safeguards that are followed in all of our operations to prevent the accidental discharge of material. Many of the storage tanks are equipped with means to gauge the volume in the tank at any given time. Secondary containment according to the contractor's SPCC Plan will be required to ensure that any spills are contained. Refer to Section 5.2.3 of this PPC Plan for details of secondary containment. The BOPs will be operable during activities involved in the drilling and completion of the well to prevent blowouts should excess back pressure be experienced.

5.2.2 Preventive Maintenance

Preventative maintenance involves the regular inspection and testing of the equipment and operational systems. A preventative maintenance program emphasizes the upkeep and maintenance of systems, which could, upon breakdown or failure, result in conditions that could cause environmental degradation or endangerment of public health and safety. If any deficiencies and/or leaks are discovered during the following preventative maintenance activities, the deficiencies are promptly corrected and any spilled material is immediately cleaned up. Site Inspection Checklist Forms are included in Appendix B.

- **Visual Observations** - The site is manned 24 hours a day and visual inspections will be conducted throughout.
- **Detailed Inspections and Monitoring**— See Section 5.4, Inspection and Monitoring Program for a list of detailed inspections.

5.2.3 Discharge and Drainage Control

- **Secondary Containment**
 - Two to three above ground storage tanks with volumes of 210 bbls (8820gal) each will utilize secondary containment as defined in the SPCC Plan
 - Frac tanks will vary in volume according to the requirements of the project. Those containing any hazardous materials will be diked accordingly to minimize run off.
- **Vapor Control**
 - Provided by pressure relief valves/fittings as appropriate.
- **Dust Control (Not applicable at this operation)**

5.2.4 Mitigation

Personnel are provided with proper protective clothing and eyewear. Cleanup will be performed with brooms, shovels, and absorbent materials for small spills, and outside contractor services for large spills.

5.2.5 Ultimate Disposition of Contaminated Materials

All contaminated soils, sorbents, and waters are disposed of through properly permitted subcontractors.

5.3 Material Compatibility

Materials held in inventory are stored properly to ensure material compatibility. Incompatible materials should be recognized and individuals working at the facility should be properly informed through signage, training, etc.

An inventory of the materials stored at the facility was taken and the corresponding Material Safety Data Sheets were collected. The chemicals comprising the Engine oil, Hydraulic fluid, Methanol Inhibitor, and Antifreeze were entered into a chemical reactivity prediction program. The Chemical Reactivity Worksheet Version 1.9, developed by the CAMEO (Computer Aided Management of Emergency Operations) Team at the Hazardous Materials Research Branch of the Office of Response and Restoration at the National Oceanographic and Atmospheric Administration (NOAA) and the Chemical Emergency Prevention and Preparedness Office at the U.S. EPA was used to predict if a reactivity hazard may occur from a scenario where two materials were mixed. The computer model did not predict any unsafe reactions between the materials kept in inventory. The computer model cannot predict reactions from three or more chemicals mixing at once.

5.4 Inspection and Monitoring Program

Inspections are made to check for leaks and potential hazardous areas and are documented on the checklist provided in Appendix B of this Plan. Specific inspections are performed as follows:

- Observing the exterior of ASTs, and other equipment for signs of deterioration, leaks, corrosion, and thinning.
- Checking the inventory of discharge response equipment and restocking as needed.

AST integrity inspections should be performed at intervals and specifications according to industry standards for the type of tanks present at the facility.

5.5 Brittle Fracture Evaluations and Preventive Maintenance

There are no field-constructed tanks that will be utilized on site.

Inspections will be conducted for the following, which could result in contamination of the work area or environment:

- Leaks in containment systems, tanks and piping
- Proper function of transfer pumps and isolation valves
- Condition of material handling equipment

Preventative maintenance will be performed on any areas found to be deficient as part of these inspections. This corrective action will be accomplished and documented. This documentation and the original inspection report will be retained in accordance with the requirements of this plan.

5.6 Housekeeping Program

The following items will be performed as part of facility housekeeping:

- Equipment, packaging materials, and miscellaneous materials will be inspected for leaks, oily surfaces, etc. Deficiencies shall be promptly corrected.
- Areas where materials are unloaded, transferred, or loaded will be kept free of debris.
- Cleanup, storage, disposal, and inspection procedures will be reviewed with facility personnel as part of the training requirements of this plan.
- Housekeeping conditions will be included in the facility inspections conducted in accordance with this plan.

5.7 Security

During various activities in the development of the well-site, there will be a need for security to be present at the entry point to the well site. During these periods, visitors are required to sign in and authorization will be required should they arrive unexpectedly. Only authorized personnel will be allowed on the site. When security personnel are not on site to guard the entrance, Range's person in charge on-site will be responsible for managing personnel arriving on site.

5.8 External Factor Planning

Employees are trained in procedures that are in place for emergency situations. Power outages, floods, and/or snowstorms may prevent operations from continuing, but should not result in an incident that would have an adverse effect on public health or the environment. Power outages do not increase the likelihood for release of pollutants and do not affect spill prevention measures, or spill containment, cleanup, and removal operations.

In the event of an external emergency situation, no operations involving regulated material transfer will be initiated at the site.

5.9 Training Program

Employee training shall be conducted periodically to ensure that all responsible employees are knowledgeable of emergency and spill response procedures. All employees with responsibilities under this plan shall receive annual training in the following areas, as required:

- Knowledge of the basic hazard and risk assessment techniques.
- Know how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.
- Know how to implement basic decontamination procedures.
- An understanding of the relevant standard operating procedures and termination procedures.

Employees completing the training shall be capable of demonstrating competency in the above training elements. Elements of the plan that enhance the prevention and management of environmental and safety incidents should also include and provide for training in these areas:

- Housekeeping
- Material Management Practices
- Loading and Unloading Procedures
- Site Emergency and Evacuation Procedures
- Preventative Maintenance
- Visual Inspections

This training shall be documented and included in the employee personnel files. A sufficient number of personnel shall be trained to ensure that personnel are capable of responding effectively to emergencies and to satisfactorily accomplish an evacuation of the facility if required.

6.0 COUNTERMEASURES

6.1 Countermeasures to be Undertaken

Spills of liquid material (mineral oil or aliphatic hydrocarbon) may occur from storage tanks, flow loop, equipment leaks, or spills during transfer. In the event of a spill or release, designated personnel will take the following steps:

6.1.1 Petroleum-Based Release or Hazardous Material Response Procedures: Minor Release

In the event of a minor release of oil or petroleum product to the environment, the following emergency response procedure will be conducted. A minor release is defined as a release of **less than 25 gallons** of oil product and/or less than the reportable quantity of a material to an aboveground surface, which is contained to the immediate area and does not adversely impact human health and the environment, and **does not immediately threaten groundwater or surface water**. In the event of a minor release, the following procedure will be conducted if personal safety is not at risk:

- Upon discovering a spill, the employee must immediately notify the Emergency Coordinator.
- The Emergency Coordinator will determine if the spill cleanup is within the capabilities of the Range Resources personnel to contain.
- The Emergency Coordinator may initiate the following activities, if deemed appropriate:
 - Shutdown all facility operations; and
 - Invoke evacuation of the facility.
- If the determination is made that Range Resources personnel can respond to the spill safely, then booms, spill stoppers, and absorbent materials will be deployed to contain the spill and prevent the released material from migrating.

- The Emergency Coordinator will make the necessary notifications to key Range Resources personnel, local emergency agencies, and the spill response contractor, as required.
- Call a spill response contractor listed in Section 7.1, if the on-site personnel are unable to control the release or if cleanup is necessary.
- Notify the National Response Center (1-800-424-8802) to report the release if the released material is capable of reaching navigable waters. A listing of the Emergency Response telephone numbers is provided in the Section 7.1 and 7.2.
- Assess the area to ensure that human health and environmental hazards have been mitigated.
- Complete an incident report and update the PPC Plan and the SPCC Plan. Refer to Appendix A for a copy of the Incident Report Form.

6.1.2 Petroleum-Based Release or Hazardous Material Response Procedures: Major Release

A major release is defined as a release of **25 gallons or greater** of oil product and/or over the reportable quantity of a material to the environment or a release which **immediately threatens groundwater or surface water**. In the event of a major release where the material cannot be controlled, contained or mitigated by facility personnel, the following procedure will be implemented:

- If imminent danger exists, immediately notify everyone at the facility. Engage appropriate evacuation procedures, as necessary.
- Upon discovering a spill, the employee must immediately notify the Emergency Coordinator.
- The Emergency Coordinator will determine if the spill cleanup is within the capabilities of the Range Resources personnel to contain.
- The Emergency Coordinator may initiate the following activities, if deemed appropriate:
 - Shutdown all operations; and
 - Invoke evacuation of the site.

- If the determination is made that Range Resources personnel can respond to the spill safely, then booms, spill stoppers, and absorbent materials will be deployed to contain the spill and prevent the released material from entering the nearest down-gradient storm drain.
- The Emergency Coordinator will make the necessary notifications to key Range Resources personnel, local emergency agencies, and the spill response contractor, as required.
- Call a spill response contractor listed in Section 7.1, if the on-site personnel are unable to control the release or if additional cleaning is necessary.
- Notify the National Response Center (1-800-424-8802) to report the release if the released material is capable of reaching navigable waters. A listing of the Emergency Response telephone numbers is provided in Section 7.1 and 7.2.
- Contain the released product with all available equipment. All spent absorbent material will be placed in appropriate containers and properly transported off-site for disposal.
- Assess the area to ensure that human health and environmental hazards have been mitigated.
- Complete an incident report and update the PPC Plan and SPCC Plan. Refer to Appendix A for a copy of the Incident Report Form. Notify the Emergency Coordinators and/or Acting Emergency Coordinators. A listing of the Emergency Response telephone numbers is as follows.
 - **Spill response contractor** listed in Section 7.1, if the on-site personnel are unable to control the release or if cleanup is necessary.
 - **National Response Center (1-800-424-8802)** to report the release if the released material is capable of reaching navigable waters.
 - **Pennsylvania Department of Environmental Protection (PADEP) (412-442-4000)** within 30 minutes of a major release.
 - **Pennsylvania State Police (911)** within 30 minutes of a major release.

6.2 Countermeasure to be Undertaken by Contractors

A release that cannot be contained, controlled, and/or cleaned up by on-site personnel will require assistance from an emergency contractor listed in Section 7.1. The emergency contractor will take all necessary measures to contain, control, and/or clean up the release.

6.3 Internal and External Communications and Alarm Systems

During a spill or release, cellular telephones, 2-way radios, voice, and/or hand signals are utilized to provide immediate instruction to facility personnel. Telephones are utilized to communicate with emergency contractors and emergency response agencies in the event of a spill or release.

6.4 Evacuation Plan for Facility Personnel

In the event of a spill or release beyond a minor incident, all visitors and personnel not essential to the control and cleanup operations will evacuate the area. These individuals will exit the facility through the nearest available exit and proceed to the assembly point identified by the Emergency Coordinator (if possible, an area upwind and uphill from the incident). Employees can exit the facility by means of one (1) access road and travel in either direction along public roads to a place of safety. Signals used to begin evacuation will be voice or radio. At the assembly point, the Emergency Coordinator or their designee will be responsible for a head count to ensure that all personnel have been accounted for.

6.5 Emergency Equipment Available for Response

Emergency equipment is maintained in proper working order, clearly labeled, and stored in strategic locations. Emergency equipment includes, portable fire extinguishers (periodically tested), spill control equipment, and first aid supplies. The spill control equipment is maintained in spill kits containing the following materials.

- 55 Gallon Drum
- Personal Protective Equipment- Nitrile gloves, Poly Tyvek, Overboots
- Oil absorbent pads, 4" oil absorbent boom, and oil absorbent granular floor dry.

If additional equipment is needed, an Emergency Response Contractor listed in Section 7.1 will be contacted to assist in containment and cleanup efforts.

After an emergency, all the equipment used will be decontaminated, cleaned, and inspected for proper working order before normal operations resume.

6.5 Emergency Equipment Maintenance and Decontamination

All equipment used for emergency procedures shall be kept in satisfactory condition and maintained and or replaced as needed. All contaminated tools or equipment shall be properly cleaned or disposed. Emergency equipment shall be tested for proper working order and be replaced as necessary.

6.6 Disposal

Waste oils, fuels, and contaminated rainwater collected at the facility as a result of a spill that cannot be recovered will be properly disposed at an appropriately permitted facility. Some liquids may also be re-used. Disposal Sites in which produced water disposed of are as follows:

Liquid Assets Disposal (LAD)

New Castle Environmental

Franklin, PA Brine Treatment Plant

Tunnelton Liquids

Eureka Resources

6.7 Regulatory Agency Reporting

An incident report form is provided in Appendix A, and will supply required information for federal, state, and local authorities as required.

6.7.1 Federal Reporting

The facility will notify the appropriate regulatory agencies and submit the current Spill, Prevention, Control, and Countermeasures (SPCC) Plan to the USEPA Region III Regional Administrator and other appropriate regulatory agencies if either of the following occurs at the subject site:

- The site discharges more than 1,000 gallons of oil into or upon the navigable waters of the United States or adjoining shorelines.
- The site discharges oil over 42 gallons in two spill events within any 12-month period.

The following information will be provided to the agencies within 60 days of a reportable spill:

- Name of the facility,
- Name(s) of the facility owner/operator,
- Location of the facility,
- Date and year of initial facility operation,
- Maximum oil storage or handling capacity and daily throughput,
- Description of facility, including maps and diagrams,
- Complete copy of the PPC and/or SPCC and amendments,
- Cause of the spill, including failure analysis, and
- Corrective actions and/or countermeasures taken.

6.7.2 State Reporting

An incident report form that will supply required information for federal, state, and local authorities is included in Appendix A.

Within fifteen (15) days of a reportable incident, the Facility will submit a written report to the PA DEP. A reportable incident includes the following:

- The facility discharges any quantity of oil or regulated substances that immediately threatens groundwater or surface water.
- The facility discharges at least 25 gallons of oil or a regulated substance onto an aboveground surface.
- A release of a hazardous substance to an aboveground surface that exceeds its reportable quantity under the Comprehensive Environmental Response, Compensation, and Liability (CERCLA) Act of 1980 and 40 CFR Part 302 (relating to designation, reportable quantities, and notification).
- A release of brine with a Total Dissolved Solids concentration less than 10,000 mg/L of 15 gallons or more.
- A release of brine with a Total Dissolved Solids concentration greater than 10,000 mg/L of 5 gallons or more.

The following information will be provided to the PA DEP within 15 days of a reportable spill:

- Name, address, and telephone number of the installation,
- Date, time, and location of the incident,
- A brief description of the circumstances causing the incident,
- Description and estimated quantity by weight or volume of materials or wastes involved,
- An assessment of any contamination of land, water, or air, which has occurred due to the incident,

- Estimated quantity and disposition of recovered materials or wastes that resulted from the incident, and
- A description of what actions the installation intends to take to prevent a similar occurrence in the future.

6.8 Fire Suppression System

Fire extinguishers are inspected periodically. These extinguishers are placed in strategic locations throughout the site. All fire extinguishers on site are compliant with American National Standards Institute (ANSI) criteria for responding to ABC class fires. These systems will be used only for small and immediately confined (first responder) fires. In all other incidents, the local Fire Department listed in Section 7.1 will be contacted to combat the fire.

6.9 Medical and Fire Emergency Plans

In the event of a medical emergency, the Emergency Coordinator must request outside emergency medical services and transportation to local hospital emergency room. Refer to Section 7.1 for emergency contact phone numbers. Contaminated individuals will be removed from the site and gross contamination will be removed by taking or cutting off their clothing.

If there is imminent danger, the Emergency Coordinator will evacuate personnel. Upon evacuation of the site, all employees, except those with emergency responsibilities, are to go to a location designated by the Emergency Coordinator which is upwind of the incident location and remain there until a head count can be taken. Under no circumstances are employees to go home until given approval to do so by the Emergency Coordinator or a designated representative.

7.0 EMERGENCY SPILL CONTROL NETWORK

7.1 Arrangements with Local Emergency Response Agencies and Hospitals

In the event of an accident, spill, or release requiring outside assistance, the following emergency response contractors, agencies, and hospitals are available to assist the facility.

Medical Agencies	
Washington Hospital	(724) 225-7000
Ohio Valley Hospital	(740) 283-7000
Canonsburg Hospital	(724) 745-6100
Washington Hospital – Burgettstown Medical Plaza	(724) 947-6261
Southwest Regional Medical Center	(724) 627-3101
St. Clair Hospital	(412) 561-4900

Ambulance Service	
South Franklin Township Ambulance and Chair	(724) 225-8050
Fort Cherry Ambulance	(724) 926-7200

Emergency Contacts	
All Emergencies	911
Waynesburg Fire Department	(724) 627-5426
Chartiers VFD	(724) 745-9477
Fire: Hickory Fire Department	(724) 356-7801
Police: Hickory Police	(724) 356-7917

Emergency Response Contractors	
Spills: Weavertown Environmental Group	(800) 746-4850
Alex E. Paris	(724) 947-2235
Pipelines: Alex E. Paris	(724) 947-2235
TEAM Industrial Services Inc.	(800) 662-8326

7.2 Notification Lists

The Emergency Coordinator will notify the following company officials, as appropriate:

Range Resources – Company Officials

Name	Title	Telephone Number
Mark Hansen	Vice President - EHS	(817) 869-4217
Ray Walker	Vice President – Shale Appalachia	(724) 743-6700
John Applegath	Vice President - Operations	(724) 743-6700

The following list of government agencies and emergency organizations will be notified, as required, depending on the emergency and required response:

Emergency Management Contacts

Reporting Agency	Telephone Number
Weavertown Environmental 24-Hour Emergency Response	(800) 746-4850
Alex E. Paris 24-Hour Emergency Response	(724) 947-2235
County of Emergency Management Agency Washington County [Monday – Friday 8:30 a.m. – 4:40 p.m.] *Nights and weekends all calls are forwarded to 911	(724) 228-6911
PA DEP Regional Office	(412) 442-4000
PA Emergency Management Agency	(717) 783-8150
PA DEP Emergency Hotline	(800) 541-2050
National Response Center (Only if the spill leaves the property and is likely to enter navigable waters)	(800) 424-8802
PA Fish Commission Waterways Patrolman	(814) 445-8974

A written follow-up requirement is required within 15 days after reporting the spill. This written report should be mailed to the agencies with the exception of the National Response Center, which does not require a written follow-up. An incident report form that will supply all of the

required information for federal, state, and local authorities and mailing addresses is included in Appendix A.

7.2.1 Notification Protocol

The following narrative should be followed for making initial verbal contact with any Emergency Agency:

“This is *[state your full name]* with Range Resources – Location Coordinates. We have an emergency. Our emergency is a *[specify type of emergency.]*”

FOR PRODUCT SPILL:

It is estimated that *[state quantity]* of *[state product]* has been released.

The spill is *[contained/not contained]*.

The release occurred at *[state time – a.m./p.m.]* and lasted for approximately *[state period of time]*.

The medium or media into which the release occurred is *[state air, water, ground etc.]*.

The number of people known to be involved in the emergency is *[state number]*.

There are *[state number]* of injuries known at this time.

WAIT FOR OTHER PARTY TO HANG UP FIRST!

7.3 Downstream Notification

Not applicable at this facility.

8.0 STORMWATER MANAGEMENT ACTIVITIES

No stormwater drains are located at the sites identified in the Drilling Permit Application. Intermittent or perennial waterways within the anticipated area of influence, in the event of a release at the site, will be identified and mitigated

The procedures for site housekeeping and inspections programs, are considered to be reasonable and appropriate, and are consistent with Best Management Practices for this type of site in regards to stormwater management.

9.0 EROSION AND SEDIMENTATION PREVENTION

During construction or earth disturbance, the control of sediment migration and erosion is addressed by installing silt fences where appropriate and promptly covering disturbed land with topsoil and seed.

Where required, an Erosion and Sedimentation Control General Permit 1 will be obtained from the PADEP. An Erosion & Sedimentation Control Plan will be prepared for each site where earth disturbance activities will occur and will contain the following:

General Information

Project Description

Erosion & Sedimentation Control

Staging of Activities

Maintenance Program

Seeding, Mulching & Soil Conditioning

Hydrology

Soil Maps

Soil Information

Location Map

Exhibits

Access Road Construction

Construction Entrance

Roadway Drainage

Culvert Installation

Broad Based Dips

Filter Fabric Construction

Straw Bale Filters

Ditch Details

Maps & Plans

Access Road Plan

Well Site Plan

List of Symbols

10.0 ADDITIONAL REQUIREMENTS FOR EPCRA SECTION 313 FACILITIES

Not applicable. The site does not meet the criteria for EPCRA Section 313 reporting.

11.0 SIGNATORY REQUIREMENTS

The Preparedness, Prevention and Contingency Plan certification signature is included in Section 1 and signed by a signature authority as required.

12.0 PLAN REVISION AND RECORD RETENTION

The following documents related to this Preparedness, Prevention and Contingency Plan shall be kept on file for a period no less than three years:

- Inspections Records
- Corrective Action Documentation
- Training Records
- Annual Inspection Reports
- Spill Reports

This plan shall be amended whenever:

- There is a change in site construction, operation, or maintenance that may affect the discharge of significant quantities of pollutants to water, air, or land of the state.
- If a site inspection indicates the need for a plan amendment.
- If the project is found to be in violation of any of the discharge permit conditions.

A record of amendments and description of the amendments shall be signed by the Signature Authority and maintained in accordance with this section. This is included in Section 2.

APPENDIX A



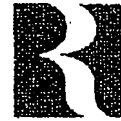
INCIDENT REPORT

Environmental & Safety
V2007-1

GENERAL INFORMATION			
LOCATION:			DISTRICT:
DEPARTMENT:			FIELD:
REPORTED BY:			PHONE #:
NOTIFIED BY:			PHONE #:
WITNESSES:			PHONE #:
DATE OF INCIDENT:	TIME:	DATE REPORTED:	
PHOTOS TAKEN?	Yes <input type="checkbox"/> No <input type="checkbox"/>	IF YES, SENT TO:	
INCIDENT:	RANGE <input type="checkbox"/> CONTRACTOR <input type="checkbox"/>	CONTRACTOR/OTHER:	
INCIDENT DETAILS			
INJURY:		PROPERTY DAMAGE:	ENVIRONMENTAL:
Injured Party: _____ Injury Type: _____ Lost Days (if applicable): _____ Date Returned to Work (if applicable): _____		<input type="checkbox"/> Other: _____	<input type="checkbox"/> Spill Volume _____ <input type="checkbox"/> Spill Recovered _____ bbls <input type="checkbox"/> Water <input type="checkbox"/> Hydrocarbon <input type="checkbox"/> Emulsion <input type="checkbox"/> Gas <input type="checkbox"/> Gas Leak Volume _____ <input type="checkbox"/> Public Impact / Complaint <input type="checkbox"/> Emission Limit Type _____ <input type="checkbox"/> Regulatory Action
OSHA	Env Reportable?	PROCESS LOSS:	TERRAIN AFFECTED:
_____	Yes <input type="checkbox"/> No <input type="checkbox"/>	Other (Specify) _____ Total Estimated Cost: _____ AFE # (if applicable): _____	_____
PERSONNEL/GOVERNMENT AGENCIES NOTIFIED (IF MORE SPACE REQUIRED, PLEASE LIST ON SEPARATE SHEET)			
DATE NOTIFIED:	AGENCY CONTACT PERSON:	CONTACT PHONE #:	AGENCY/RANGE DEPARTMENT:
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Clearly describe how the incident occurred (ex: who, what, when, where, why and how. Address all items checked above. Include recent trends based on risk assessments and observations. Update this section as information becomes available.			
Date	Description		
_____	_____		
_____	_____		
_____	_____		
_____	_____		
REMEDIAL ACTIONS (to reduce or eliminate the direct and indirect causes)			
Description	Target Date	Completed Date	Action By
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Please E-Mail Completed Form to mhanzen@rangeresources.com or fax to (817) 869-9168 attn: EHS Dept.

APPENDIX B



RANGE RESOURCES

June 3, 2009

Mr. Vince Yantko
Pennsylvania Department of Environmental Protection
California District Office
25 Technology Drive
Coal Center, Pennsylvania 15423

Dear Mr. Yantko:

**Subject: Incident Report
Range Resources – Appalachia LLC
Cross Creek County Park Well Nos. 14H, 15H, and 16H
Well Permit Nos. 37-125-23165-00, 37-125-23182-00, and 37-125-23300-00
Hopewell Township, Washington County, Pennsylvania**

Range Resources – Appalachia, LLC (Range Resources) is submitting this letter as an incident report regarding the spill incident that occurred at the Cross Creek County Park Well Nos. 14H, 15H, and 16H in Hopewell Township, Washington County, Pennsylvania. The Cross Creek County Park Well Nos. 14H, 15H, and 16H are permitted by the Pennsylvania Department of Environmental Protection (PADEP) Bureau of Oil & Gas Management under Permit Nos. 37-125-23165-00, 37-125-23182-00, and 37-125-23300-00, respectively. This submittal contains the following information regarding the incident:

- A description of the incident, including the cause of the incident and notifications that were made;
- Actions taken to contain the release;
- Actions taken to recover the spill; and
- Actions to be taken to prevent a similar incident in the future.

Description of Incident

On May 26, 2009, Range Resources was pumping flowback water from the hydraulic fracturing (fracing) of the three wells. The water was being conveyed through a 6-inch diameter high density polyethylene (HDPE) pipe from the well locations to the Lowry impoundment. The Lowry impoundment is permitted for the collection/storage of flowback water by the PADEP with a Dam Permit for a Centralized Impoundment Dam at Marcellus Shale Sites (Permit No. DOG6309-001).

The majority of the HDPE was welded using a fusion welder. However, 3 sections of HDPE pipe were connected via bolted, flanged couplings. Couplers were used in this location so that

the piping could be installed in the culvert under the temporary access road to the Hamilton farm pond. All piping was put in place and the couplings were connected. Then, prior to pumping fluid through the HDPE pipe, the pipe was pressure tested to 100 pounds per square inch (psi) to ensure that the couplings were properly installed and there were no leaks in the pipe. A copy of the records from the pressure testing of the pipe is included with this submission. These records show that the pressure was held for 30 minutes with no drop in pressure, indicating that there were no leaks in the pipe at that time.

At approximately 1:30 pm, a Range Resources contractor was walking the pipeline and discovered a leak at 2 of the couplings. The leak was approximately 500 feet from the location of the 3 wells, just below the Hamilton farm pond. At that time, notification was made to the appropriate Range Resources employees who immediately responded to the location to assess the incident and respond. He also made notification to additional Range Resources employees for response purposes.

Range Resources personnel immediately shut down the flowback operation when the leak of flowback water was discovered. Upon further investigation, Range Resources personnel determined that the water had leaked from the pipe at the location of 2 of the couplings due to the fact that 3 of the bolts for each of the couplings were loosened. Range Resources was unable to determine how the bolts, all on the underside of the couplings, were loosened. Due to the loose bolts, the water leaked, pooled in a low spot of the existing ground surface at the location of the leak, and then flowed via overland flow into an unnamed tributary to Cross Creek. When Range Resources personnel had assessed the situation, DEP personnel were then notified via telephone at approximately 5:15 pm. The attached photographs show the location of the leak.

Actions Taken to Contain the Release

Upon discovering the incident, Range Resources personnel immediately took steps to attempt to contain the release. The flowback of the well was immediately shut down so that no more flowback water would flow through the pipe. Additionally, several check dams were constructed in the unnamed tributary to Cross Creek in an attempt to prevent the flowback water from being conveyed downstream to Cross Creek and Cross Creek Lake. The couplings on the pipeline were then tightened to eliminate any future potential for leaks. The remainder of the flowback water was then trucked to the impoundment location for collection/storage instead of pumping through the pipeline to prevent any additional incidents from the piping.

Actions Taken to Recover the Spill

Flowback water that was contained by the check dams installed in the unnamed tributary was pumped out by a vacuum truck in locations that were accessible. Additionally, any soil affected by the spill of flowback water was excavated from the area and placed in three lined dumpsters on site. Sampling and analysis of the soil in the dumpsters will be performed to determine the final disposition of the soil. The entire area of disturbance was immediately seeded and mulched. The attached photographs show the area following soil removal and seeding and mulching.

Mr. Vince Yantko
June 3, 2009
Page 3

Actions to be Taken to Prevent a Similar Incident in the Future

In the future, the use of bolted flanged couplings will be minimized or eliminated on piping being used to convey flowback water. Additionally, line inspections will be performed more frequently, especially at bolted flanged connections. When pumping is ceased between stages of water conveyance, all flanged connection integrity will be verified. If required, the connections will be tightened prior to commencement of pumping water through the piping for the next stage. Finally, if possible, spill containment kits will be located along the line where there are bolted connections.

If you have any questions, or require any additional information, please call me.

Very truly yours,

RANGE RESOURCES -- APPALACHIA, LLC



Carla L. Suszkowski, P.E.
Environmental Engineering Manager

Enclosures

PIPE PRESSURE TESTING RECORDS

Cooled Tubing, Nitrogen & Fluid Pumping Services



P.O. Box 1182

2271 US Highway 287 South
Decatur, Texas 76234

Phone: (240)-628-1504
Fax: (240)-628-1508

Gr 91-1

67-68 Ticket No 003822

Date(s): 5-16-09

BT To:

Address:

City:

Wed 10

Field:

County, State

RANGE RESOURCES
300 SOUTHEAST BLVD SUITE 300
CANNONBERG, PA. 15312
LAWRY #3
WASHINGTON, PA

Invoice:

Inv. Datas:

8RO &

PO 5

AFE #:

Job Description: PSI-FLUIDITY PIPELINE

MATT WARNER
(Print Name)

CUSTOMER AGENT - FIELD APPROVAL

MEW

[illegible]

Page 5-16-69

PHOTOGRAPHS

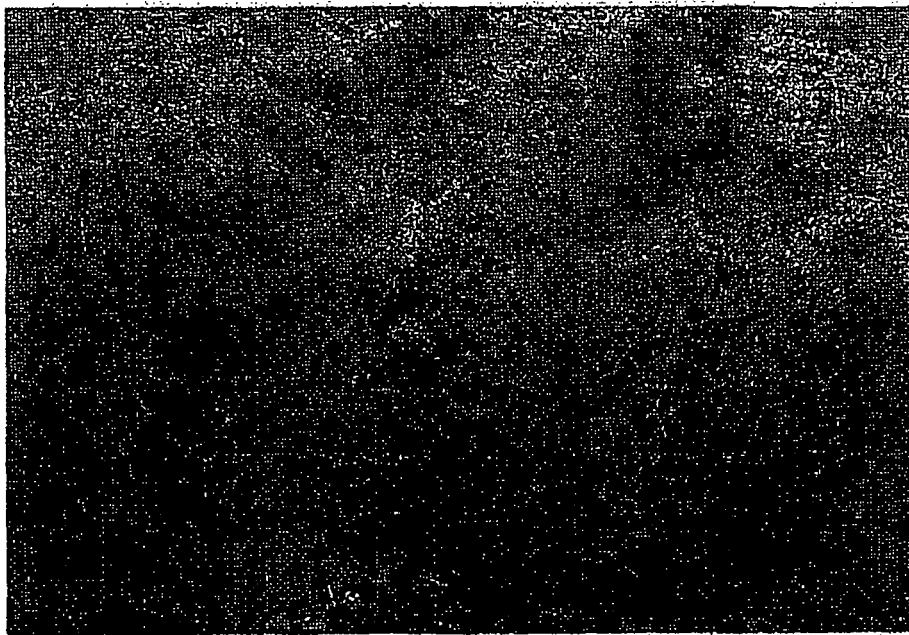


PHOTO #1

Coupling where loose bolts were found and leak occurred. Picture was taken after clean-up and water in low spot at pipe is fresh water.



PHOTO #2

Coupling where loose bolts were found and leak occurred. Picture was taken after clean-up and water in low spot at pipe is fresh water.

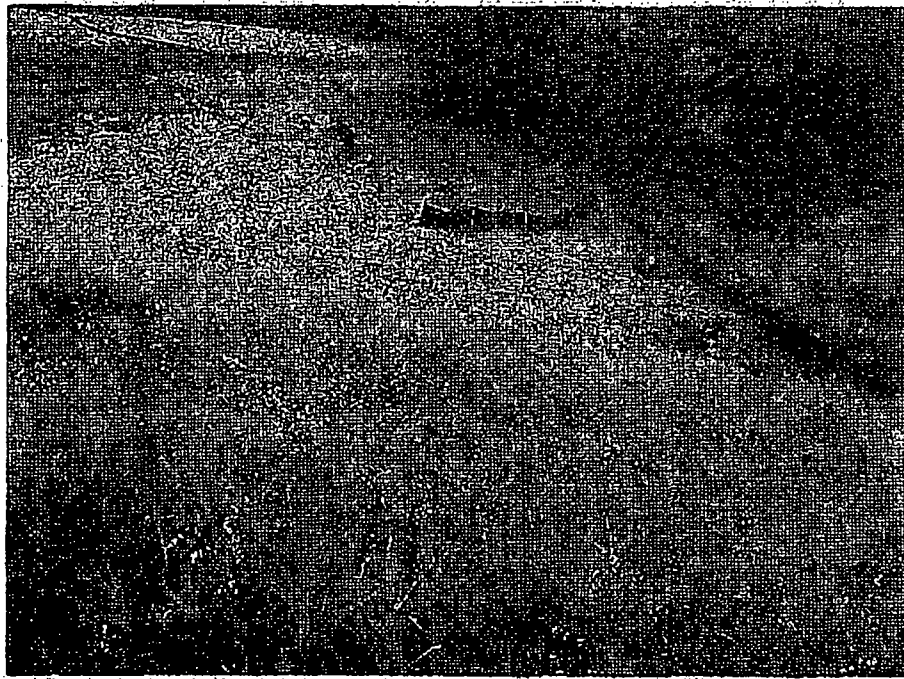


PHOTO #3

Down slope area affected by spill following clean-up and seeding and mulching

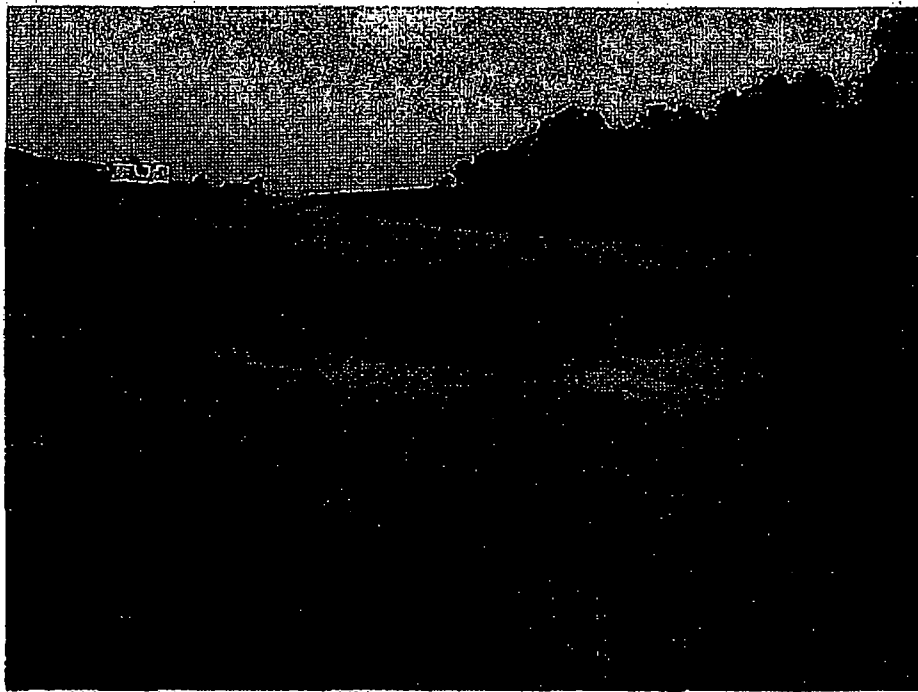


PHOTO #4

Down slope area affected by spill following clean-up and seeding and mulching



RANGE RESOURCES

October 8, 2009

Mr. Vince Yantko
Pennsylvania Department of Environmental Protection
California District Office
25 Technology Drive
Coal Center, Pennsylvania 15423

Dear Mr. Yantko:

Subject: Incident Report
Range Resources – Appalachia LLC
Kearns Unit Well Nos. 1H, 2H, 3H, 4H, 5H and 6H
Well Permit Nos. 37-125-23274, 37-125-23275, 37-125-23640, 37-125-23644, 37-125-23641, and 37-125-23642
Hopewell Township, Washington County, Pennsylvania

Range Resources – Appalachia, LLC (Range Resources) is submitting this letter as an incident report regarding the spill incident that occurred in conjunction with the fracturing operations on the Kearns Unit Well Nos. 1H, 2H, 3H, 4H, 5H and 6H in Hopewell Township, Washington County, Pennsylvania. The Kearns Unit Well Nos. 1H, 2H, 3H, 4H, 5H and 6H are permitted by the Pennsylvania Department of Environmental Protection (PADEP) Bureau of Oil & Gas Management under Permit Nos. 37-125-23274, 37-125-23275, 37-125-23640, 37-125-23644, 37-125-23641, and 37-125-23642, respectively. This submittal contains the following information regarding the incident:

- A description of the incident, including the cause of the incident and notifications that were made;
- Actions taken to contain the release and recover the spill; and
- Actions to be taken to prevent a similar incident in the future.

Description of Incident

On Tuesday, October 6, 2009, Red Oak Water Transfer (Red Oak) was pumping diluted flowback water from Range Resources' Bednarski Impoundment to the Kearns frac. The water was being conveyed through an approximately 6-mile long run of 8-inch diameter PVC pipe that had been pressure tested prior to pumping the diluted flowback water. The pipe was hydrostatically pressure tested using fresh water to 150 psi on Thursday and Friday, October 1 and 2, 2009. The straight sections of pipe were connected with couplers specifically for this type of pipe to prevent leaks; however, at connections such as elbows, the connections were glued. The piping held the pressure

Range Resources – Appalachia LLC

380 Southpointe Blvd Suite 300 Canonsburg, PA 15317 Tel: (724) 743-6700 Fax: (724) 743-6790

when pressure tested with fresh water. The piping was laid through a culvert under Cherry Road with a 90 degree elbow in the piping on the upstream end of the culvert and the piping then went up a hill. This elbow was glued.

On October 6, 2009, Red Oak was transferring the water at a rate of 22 bbls per minute and an approximate pressure of 140 psi. In an effort to keep a sufficient supply of water in the Kearns Impoundment for the frac, the rate of pumping was increased to 25 bbls per minute with an approximate pressure of 145 psi. At approximately 7:00 pm, Red Oak noticed that they had lost pressure in the line and immediately turned the pumps off. The Red Oak employee discovered that at the 90 degree elbow connection at the culvert had broken loose and had ruptured (N40° 12' 39.6" and W80° 23' 51.2"). He immediately reported to Matt Werner and Jeremy Matinko of Range Resources that the line had ruptured at the 90 degree elbow connection and the diluted flowback water had spilled. Matt Werner of Range Resources calculated that approximately 250 barrels of the diluted flowback water had spilled out of the piping onto the ground. At the location of the elbow, the piping was laying in an unnamed tributary to Brush Run. Brush Run is a tributary to Buffalo Creek, which is a High Quality waterway.

Jeremy Matinko reported the spill to the PADEP Oil and Gas Inspector (Richard Freese) at 7:40 pm. He also went out to the site to observe and respond to the spill. In addition to Jeremy reporting to Richard Freese, Carla Suszkowski phoned Mike Arch, the PADEP Inspector Supervisor, and reported the spill. The primary contributing factor that led to this failure was found to be a defective elbow coupling that parted during the pumping process.

Actions Taken to Contain the Release and Recover the Spill

Upon discovering the incident, Range Resources personnel immediately took steps to attempt to contain the release. As previously stated, Red Oak personnel immediately shut down the pumps and flow was halted through the pipe. A vacuum truck was used to clean out 500 gallons of the spilled water that was contained in low areas in the tributary. In addition, absorbent material was also used in the immediate area of the spill to soak up residual fluid. The area was also flushed with approximately 1,200 gallons of fresh water.

Within 1 hour of the spill, Red Oak had reconnected the pipe at the elbow and had resumed pumping. They reconnected the pipe with a similar glued connection. They continue to monitor and walk the pipeline every 30 minutes to help to ensure that a similar incident does not occur again.

A sample of the diluted flowback water was taken from the piping and sent for characterization. The results are given below:

- pH = 7.7
- Chloride = 11,000 mg/L
- Specific Gravity = 1.015
- Hardness = 37.4 mg/L
- Calcium = 1503 mg/L
- Iron = 3 mg/L
- Bicarbonate = 146 mg/L

Range Resources took part in the inspection conducted by the PADEP on October 7, 2009. At the time of the inspection, the PADEP identified a loss of approximately 200-300 minnows, collectively weighing less than 1 pound. At the time of the inspection, the PADEP also went upstream of the point of the spill and identified what appeared to be a sewage discharge into the unnamed tributary. No samples of the discharge could be collected because no sample bottles were available.

Actions to be Taken to Prevent a Similar Incident in the Future

To prevent a similar incident in the future, Range Resources is in the process of developing a Water Transfer Operating Standards to include as an Appendix to our Preparedness, Prevention, and Contingency (PPC) Plan that contractors will be required to follow when installing and using above-ground pipeline for flowback water pumping. Range Resources anticipates that some of the safe-guards to be included in this plan are:

- Detailed description of how the hydrostatic pressure test shall be conducted and how the pressure shall be determined for testing;
- Procedures for addressing leaks during hydrostatic pressure testing;
- Detailed procedures for piping run through culverts under roads;
- Procedures for the installation of check valves at low points to prevent spills if a piping failure does occur;
- Description of the line inspections to be performed by the contractor, frequency of the inspections, and documentation of the inspections;
- Descriptions of the location of spill containment apparatus and procedures to be followed if a piping failure occurs near a stream;
- Procedures for addressing leaks that occur during operation; and
- Procedures to drain lines, contain fluids, repair the line and re-pressure test the pipeline.

In addition to the development of this plan, Range Resources will review our Preparedness, Prevention, and Contingency (PPC) Plan for Washington County and

Mr. Vince Yantko
Pennsylvania Department of Environmental Protection
October 8, 2009
Page 4

make appropriate changes to the plan in light of this incident. Both of these plans will be submitted to the PADEP by October 16, 2009, unless requested otherwise by the PADEP.

If you have any questions, or require any additional information, please call me.

Very truly yours,

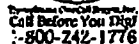
RANGE RESOURCES - APPALACHIA, LLC

A handwritten signature in black ink, reading "Carla L. Suszkowski". The signature is fluid and cursive, with the first name "Carla" and last name "Suszkowski" clearly legible.

Carla L. Suszkowski, P.E.
Environmental Engineering Manager

cc: Jack Crook, PADEP Southwest Regional Office
Alan Eichler, PADEP Southwest Regional Office
Michael Sherman, PADEP Central Office
Barbara Sexton, PADEP Central Office

APPENDIX C



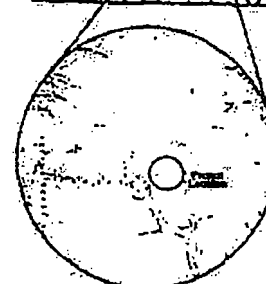
PROPOSED FRACKING POND

BOTTOM ELEVATION: 1777.0'
BERM ELEVATION: 1792.0'

DESIGN INFO:

INSIDE SLOPES: 3.5:1
OUTSIDE SLOPES: 2:1
POND BOTTOM SLOPE: 1%
BEFM WIDTH: 15'

Pond Volume:
6,677,329.67 gallons (U.S.)
158,984.04 barrels (petroleum)



Location Map
Parton 24 U.S.G.S.
Holzer's Drawings

A representative of Simon & Schuster Incorporated has prepared this form. Each page of this form is the PROPERTY of Simon & Schuster, Inc. Each page must be retained, and must contain CONFIDENTIAL, PROPRIETARY INFORMATION, OR THE NAMES OF OTHER PERSONS BY WHOM SIMON & SCHUSTER INCORPORATED.

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Class is provided, independent of course to ERM the student right, for construction of the Web described in this page.

Proposed Fracking Pond

For
Range Resources Appalachia LLC
Cottage Township
Lycoming County
Commonwealth of Pennsylvania



Hawbaker
CONSTRUCTION SERVICES

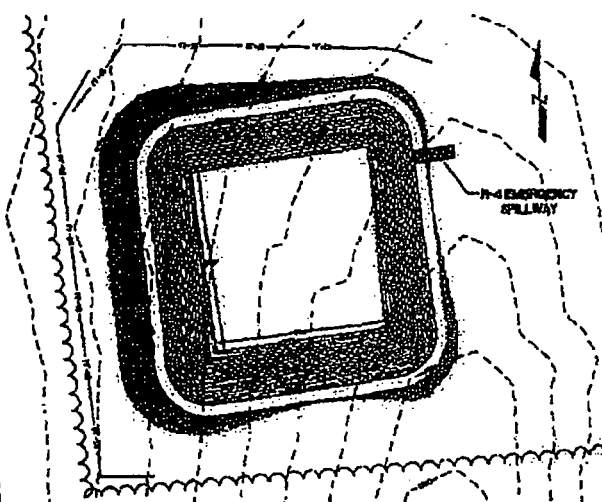
Western Division
20000 Lakes
Memphis, TN 38119
PH (901) 444-4444
FAX (901) 444-4444

Layer

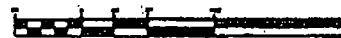
104



GRAPHIC SCALE



GRAPHIC SCALE



APPENDIX D

Appendix D

Preventive Spill Plan

The purpose of this portion of the PREPAREDNESS PREVENTION AND CONTINGENCY PLAN (PPC) is ensure that adequate engineering controls are designed and utilized to minimize the potential of a spill being created due to a failure. This protocol allows for the standard practice of defining a quality control process or process safety management which assesses the process flow as a means to maintain continuous improvement during the transferring of liquids. The Management of Change procedure will be implemented to ensure that like parts are utilized and an approval of the change has been authorized by a competent Range Resources representative. In order to achieve this, the processes will be separated into various sections that have the potential to have a spill. For each section, the process control, engineering review of equipment and means to ensure that all contractors and Range Resources' personnel are aware of the processes involved and are trained accordingly.

The quality process will highlight the following areas:

TRAINING

Contractor: Range Resources will provide documented training on the PPC Plan to ensure that all contractors are aware of its function and issue them a traceable copy (controlled document). Each copy of the PPC Plan will be assigned a number referencing that contractor's name. A log of the issuance will be maintained by the Range Safety Department in Canonsburg, PA. The contractor will be instructed that it is necessary for their copy to be present with their employees when they are conducting business for Range or when they are present on any Range site. Copies of the issued PPC Plan can be reproduced and distributed to their employees as necessary.

It is the responsibility of the contractor to provide training to their employees that will be in a position that requires them to act in the event of a release (leak or spill). These employees will need to understand the function of the PPC Plan along with the reporting structure that must be

followed. Range has the right to require that these employees understand and follow the protocol established to ensure that failures do not occur. Failure to follow these work requirements could jeopardize the contractor's ability to conduct business with Range in the future.

Contractor Employees: In an effort to eliminate the potential for releases, it is the responsibility of the contractor to provide adequate training to its employees so that they have a level of competency to perform their tasks proficiently. Each employee should understand and recognize hazards within their areas of operation that could pose harm to personnel or the environment. Employees should recognize that specified equipment is being installed and should ensure that any substitutions of equipment or materials follow an approved Management of Change process.

Any new employees hired by the contractor must be trained on the PPC Plan process. The contractor will be subject to audit by Range at any time to ensure that complete records are being maintained. It is the responsibility of the contractor to ensure that this procedure is being followed.

LIQUID TRANSFER

The transfer of fluids results in the largest risk with respect to the potential for spills which may impact the environment. Water is transferred through above ground piping in several different scenarios including, but not limited to:

- Centralized Water Impoundment to Centralized Water Impoundment
- Centralized Water Impoundment to Well Pad Storage Tanks
- Well Pad Storage Tanks to Blender
- Wellhead to Flowback Tanks
- Flowback Tanks to Centralized Water Impoundment
- Flowback Tanks to Production Storage Tanks

Range Resources has developed Construction, Operation, and Testing Standards which will be provided to all contractors installing or operating aboveground pipeline in any of these instances. The contractor will be provided training on the standards described in the plan and will be provided a copy of the standards. It will be the responsibility of the contractor to train all personnel that will be working on the pipeline on the standards and document that the personnel have been trained. Any contractor not following the standards detailed in this plan will jeopardize their right to do future work with Range Resources.

PROCESS CONTROL

Process control is a means of identifying the type of work being performed, materials to be required and a plan to install or rig up such equipment. The process will require that the flow material be engineered to meet the specifications set forth by Range for the task at hand.

Range expects that contractors will be able to professionally engineer a process that identifies materials required and that will perform the needs taking into account terrain, location size, restrictions and weather conditions as well to eliminate failure. Any additional fail-safe measures should always be recommended as new technologies are developed to minimize risk.

MANAGEMENT OF CHANGE

In formalizing a substitution process for equipment or materials, Range will utilize a process taken from Process Safety Management (29 CFR 1910.199). The use of Management of Change within this sector requires the need to ensure that the components being replaced have been selected based on their ability not to compromise the specifications of the original equipment or materials. Therefore, accurate specifications of the original equipment must be maintained in order to maintain integrity. Once a replacement product has been selected, the Management of Change must be approved by a Range representative. In some cases, supportive documentation may be requested.

Management of Change not only addresses maintenance but it also addresses what should be done should a change in the process itself be required. An approval of the change would still be documented and required by a Range representative. All personnel involved in the process will need to be trained in the understanding of the change and what modifications will need to be made.

ENGINEERING STUDY OF EQUIPMENT

The type of equipment being used to conduct the process will need to be selected based on the performance required. The specifications will be the responsibility of the contractor. The contractor will mark all transfer equipment with the pressure ratings, classification and owner's name on each section. The transfer equipment described are the sections of transfer piping, fittings or fluid transfer hoses. All gasket materials used to make connections must be inspected prior to each use in order to assure integrity. Any gaskets not deemed to be suitable will be replaced immediately. Spares should be maintained at all times so as not to compromise the transfer equipment.

Any connections that require mechanical means to secure them should ensure that the instruments are functional. Any plumbing that can become loose due to vibration must use locking mechanisms. The type of the mechanisms utilized should be engineered to maintain their integrity throughout the project.

WORK PRACTICES

The tasks being conducted by all personnel in the operation are responsible to ensure that breaches are immediately addressed once discovered. During the Job Safety Analysis or Hazard Assessment Analysis, potential non-conformities will be identified and a means to monitor will be discussed. Personnel assigned to other duties may be asked to maintain vigilance on any equipment in their view of site or designated area. All personnel conducting tasks on the worksite must be competent in the performance of their duties. Certain job tasks require

certification. Any employee conducting these functions must have current valid certifications for specified equipment type being operated where applicable.

Any SSEs (Short Service Employees) that are working in the area will be assigned a mentor who will conduct on-the-job training. The mentor must ensure that the SSE comprehends the task being assigned and can carry it out proficiently. The SSE should not be allowed to operate any equipment unless they have been authorized to by the mentor or a qualified person.

STOP WORK authority is a practice that allows any employee with any company on the work site to stop the work being performed should there be imminent danger associated with any task being performed. This practice gives authority to all individuals to monitor the worksite and make decisions that can prevent the damage to the environment, equipment or injury to any employee. The incentive for this practice is to encourage personnel to look for situations that can cause a disruption to the operation without retribution.

REPORTING STRUCTURE

A general reporting structure has been developed for all Range sites in Washington County. The flowchart of this structure is attached. No names are provided in the flowchart, due to the fact that the names may change based on the project or job task being performed. This flowchart will be reviewed on each site with all personnel performing tasks during the job and names will be assigned and phone numbers will be provided for each general job title provided on the flowchart. The flowchart will be provided to each person working on the job for their use if an incident occurs that requires reporting.

NON-COMFORMANCE

Non-conformities define the failure in either a process or a failure of equipment or materials. In order to minimize the probability of a failure, competencies must be met. All non-conformities

must be reported immediately and the corrective measures implemented. Once the control of the failure has been completed, the investigative process shall be initiated.

Bearing in mind that the term non-conformity can apply to operational issues as well as equipment functionality poses the need to ensure that personnel perform accordingly. In order to minimize equipment failure, it is imperative that personnel provide adequate maintenance and inspections. Failure to provide these services will be considered a non-conformity and corrective measures must be implemented immediately to ensure that these vital needs are met.

CORRECTIVE MEASURES

For a release, a corrective measure implies that all resources will be deployed to restrict the potential for damage to the environment. Barriers such as booms and absorbent materials are available for use in areas that can assist in restricting the flow of the released material. Vacuum trucks will be utilized where possible and remedial measure will be put in place to minimize impact.

DISPOSAL

The disposal of any liquid residual waste or produced water will be in accordance with Pennsylvania regulations and at those sites mentioned in Section 6.6 under Countermeasures of this document. These facilities have already been identified and authorized by Range Resources Regulatory Department and should not be deviated from.

Solid waste will be analyzed to determine if any hazards exist and will be disposed of according to state regulations. Identified Emergency Management contactors will be responsible for following regulations to ensure that Range complies accordingly. Any discrepancies or clarifications must receive approval from Range's Regulatory Department prior to movement of the solid waste.

REPORTING FLOWCHART/QUANTITIES

